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USSR Report

ENERGY

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USSR REPORT

ENERGY

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OIL AND GAS

MINISTER NAMES RECENT, FUTURE EARTH-SCIENCES TECHNIQUES

Moscow EKONOMICHESKAYA GAZETA in Russian No 33, Aug 84 p 2

[Article by Ye. A. Kozlovskiy, USSR Minister of Geology: "New Routes of the Underground Explorers"]

[Text] The 26th CPSU Congress gave our industry the task of providing for the further accelerated development of geological study of the country's land and of increasing the explored reserves. Specific goals for strengthening and expanding the minerals and raw-materials base were set by the USSR Energy and Foodstuffs Programs.

During the first 3 years of the five-year plan geological exploration increased 20 percent in volume, deep drilling 15 percent. Geological study of the country's land on medium scales is being completed. Large-scale geological surveys have covered about 30 percent of its area.

Altogether 385 fields of useful minerals whose reserves have been approved by the State Commission on Mineral Reserves under the USSR Council of Ministers were prepared in 1981-1983 for industrial assimilation.

The concentration of forces and material resources at the main areas and targets and completion of the exploration of a number of gigantic fields have enabled the five-year plan for growth in explored gas reserves to be met ahead of time.

Large deposits of coking and steam coal have been explored in the Donbass [Donets Coal Basin], the Kuzbass [Kuznetsk Coal Basin] and the Kansk-Achinsk, South Yakutsk and other basins, with total reserves of 11.4 billion tons, through which the construction of underground and open-cast mines with a total productivity of 156 million tons of coal year is being provided for. Exploration of fields of raw materials for producing mineral fertilizer is proceeding successfully in new regions: for phosphorites in Uzbekistan and Estonia, for apatites in Yakutia and the Ukraine, and for potash salts in Irkutsk Oblast.

Ferrous metallurgy's raw-materials base has been strengthened in the main iron-ore regions--in the Krivoy Rog basin, at the KMA [Kursk Magnetic Anomaly] and in the Northwest. In Kazakhstan, exploration at Almaz-Zhemchuzhina, the largest chromium ore field, has been completed and creation of the country's

third manganese-ore base is being completed. The raw-materials potentials of the existing mining-and-beneficiating and mining-and-metallurgical enterprises of nonferrous metallurgy have been greatly expanded.

An outstanding scientific and technical achievement is the drilling of the Kola Superdeep Hole, which is first in the world to reach a depth of 12 km.

Unique data about the structure, composition and physical state of ancient formations in deep horizons of the earth's continental crust have been obtained. During preparation for and during the process of developing the Kola hole, the theoretical bases for superdeep drilling and basically new technical means for drilling to depths of 10-15 km were created. Penetration of the Saatly hole in Azerbaijan continues. In brief, there is reason for the geologists to be proud.

At the same time, various organizations and enterprises of the branch still have not provided for rhythmic, uninterrupted operation. The ministry has permitted a lag in carrying out plans for deep exploratory drilling for oil and gas and for a growth in oil reserves. There is a large reserve for improving the activity of geological organizations and for increasing prospecting and exploration effectiveness by eliminating the existing deficiencies.

The plan for geological exploration in 1984 is oriented to securing the positive trends that have been achieved and paving the way for carrying out the five-year plan. It is aimed at further dynamic development of the country's minerals and raw-materials potentials.

Geological exploration for oil and gas is being performed intensively in West and East Siberia, the Caspian depression, the Timan-Pechora province and East Turkestan. With a view to realizing the tasks of the Foodstuffs Program, a further increase in explored reserves for extracting raw materials for producing mineral fertilizer is being conducted, basically in new regions.

Growth in Amounts of Geological Exploration (1980 = 100 percent)	
1980	100
1981	107.0
1982	114.5
1983	120.4
1984 (planned)	129.4

In connection with the approaching completion of construction of the Baykal-Amur Mainline and the forthcoming conquest of the natural resources of the area of its transport and economic influence, the preparation of explored reserves of useful minerals for the TPK [regional production complex] that is being formed and planned here has become especially acute. Exploration of the iron-ore fields of the Chara-Tokko and Yuzhno-Aldan regions in South Yakutia, which will become a raw materials base for a large metallurgical plant, and of the Kholodninskiy lead and zinc field in Buryatia, is being completed in 1984.

If the significance and complexity of the tasks being faced are considered, geological exploration in 1984 increased 7.5 percent in volume over 1983.

Almost 3.9 million meters of deep hole are to be drilled--8 percent more than in 1983, plus about 23 million meters of core-drilled hole, and 300,000 meters of underground mine workings are to be driven.

An increase in the production potential and improvement in the housing and personal-services situation for explorers of the earth depend directly upon an increase in the efficiency of capital construction. Its volume in 1984 will grow 1½-fold over 1983, and the plan for introducing apartment houses will increase 1.2-fold, facilities for production purposes 1.5-fold.

An analysis of the status of geological operations for the current year indicates that the tasks established and the commitments adopted are being carried out basically.

In accordance with the plan, the exploration of 44 fields of minerals whose reserves have been approved by USSR GKZ [State Commission for Mineral Reserves] has been completed and new storehouses of mineral raw materials have been discovered.

Realization of the 1984 plan is important not only in and of itself but it is also of decisive important for fulfilling five-year plan tasks as a whole.

For most useful minerals, the five-year plan tasks were met ahead of time. At the same time, for a number of types of mineral raw materials an extremely tense situation has been created. This relates primarily to the fulfillment of plans for deep exploratory drilling and increase in oil reserves, in which a lag was permitted in past years, as has already been noted.

Of special importance is a rise in the efficiency of the oil and gas work by RSFSR Mingeo and its organizations--Glavtyumen'geologiya [Main Administration for Geology of Tyumen Oblast] and Yeniseyneftegazgeologiya [Administration for Oil and Gas Geology of the Yenisey Region], and also by Kazakh SSR Mingeo and its Guryevneftegazgeologiya and Aktyubinskgeologiya Associations. In 1984-1985 the exploration of large iron-ore fields in the Ukraine (Gulyaypole), the KMA region (the Lebedinskoye and Mikhaylovka), Kazakhstan (the Kachar and Zapadnyy Karazhal), the BAM zone (the Tarynakhskoye, Desovskoye and Tayezhnoye) and of managanese fields in Georgia (the Chiatura) and in the Ukraine (the B. Tokmak) must be completed. The lag in construction and installing work must be overcome as soon as possible.

The mineral and raw-materials base with which the national economy will enter the 21st Century should be created now, in the 1980's.

Accelerated promotion of work on geological study of the country should be accompanied by an improvement in the quality of geological mapping. Conversion to compilation of the USSR State Geological Map on a scale of 1:50,000 will lead to a rise in the authenticity and informativeness of geological documentation, based upon the wide use of the data of geophysical and geochemical research and aerial and space surveys in unison with traditional methods.

Conversion from studying the earth's deep structure by drilling solitary holes and laying out geophysical profiles in separate regions to the systematic study of the whole country's deep structure is under way. This calls for a system of mutually coordinated regional geophysical profiles that rely upon superdeep and deep holes.

Based upon an analysis of the results of regional geological and geophysical research and the use of the data of space-geological and aerial-geophysical

surveys, standard tectonosphere models for areas with different geodynamic environments will be defined, including the main petroliferous and ore-bearing regions for the country as a whole.

Taking the achievements of many branches of the geological sciences into account, further progress will be made in mineralogenesis--study of the principles that govern the forming and distribution of useful minerals--which will promote reliability in quantitative forecast evaluations of useful mineral reserves. The problem of prospecting for deep-lying fields that do not outcrop is becoming increasingly urgent. We see its solution in improvement of edaphic forecasting, and also in a rational combining of geological methods with geophysical, geochemical and high-altitude aerial methods and highly productive hole drilling.

The necessity for finding and utilizing in integrated fashion all the constituents of useful minerals requires deep study of the material composition of rocks and ores and further improvement of industrial research. Use of the achievements of solid-state physics, crystal chemistry and physical chemistry, and also of modern methods for studying matter--electron microscopy and X-ray diffraction, laser-optics and spectroscopic methods--have enabled the level of study of the substances of mine rock and ores to be sharply raised at all stages of geological exploration.

At the juncture of mineralogy and the technology for processing mineral raw materials, industrial mineralogy, which develops methods for intensifying the conquest of the earth's riches--their integrated utilization, increase in the recovery of all useful components (the creation of a wastefree technology) and the use of geotechnological methods for working fields--is being developed. The role of this scientific field is growing increasingly in connection with the development of lean ores and the application of new industrial processes.

The strategy for developing geological exploration is linked directly with the manner in which it is reequipped. One of the component problems is that of creating basically new geophysical equipment for prospecting for and exploring fields of useful minerals that is based upon the achievements of allied sciences (mathematics, physics, automation, remote control and instrumentmaking), particularly the development of apparatus for the direct prospecting of fields of useful minerals, including three-dimensional seismic exploration that uses the principles of holography. In order to study the deep structure of the earth's crust, the introduction of high-capacity excitation sources, such as MGD's [magnetohydrodynamic generators] and laser systems, and new principles for observing the parameters of physical fields, is important. For the purpose of improving the transmission of geophysical information, the newest telemetry systems, including the use of satellite communications, must be developed.

The geological branch is increasingly obtaining information it needs from piloted orbital stations and artificial earth satellites. Integrated research performed by cosmonauts is making a considerable contribution to study of the earth's interior and is helping to find fields of useful minerals. In particular, we have obtained much valuable information also from international space crews.

The collaboration of the geologists of CEMA member countries is bearing meaningful fruit. Integrated programs of geological work that are performed within the framework of socialist economic integration will enable the mineral raw-materials bases of all participants in the collaboration to be developed harmoniously and advanced methods and progressive technical means for geological exploration to be introduced more rapidly.

11409
CSO: 1822/28

YAMBURG GAS CONDENSATE FIELD DEVELOPMENT DISCUSSED

Baku VYSHKA in Russian 28 Aug 84 p 2

[Article: "Official Department. To Yamburg, the Underground Storehouse"]

[Text] As has already been reported in print, the Politburo of the CPSU Central Committee has been looking at the question of insuring that the Yamburg gas condensate field in the Tyumen oblast is put into operation.

In the resolution adopted by the CPSU Central Committee and the USSR Council of Ministers on this question emphasis is placed on the fact that thanks to the creative efforts and selfless labor of the geologists, gas industry workers and construction workers, to the great organizational and political work conducted by the party, soviet, industry, trade union and Komsomol organizations, high growth rates are being insured in the country's gas industry, and as a result of the discovery of the unique gas and gas-condensate field in Western Siberia, a raw material base for the future speed-up this industry's growth has been established.

Considering that the Yamburg gas-condensate field will have to be the principal raw material base insuring the increase in gas recovery levels during the forthcoming five-year plan, the CPSU Central Committee and the USSR Council of Ministers have acknowledged that the most important national economic task of the 12th Five-Year Plan is to increase gas recovery levels and to keep up the gas industry's high growth rate which has already been achieved in Western Siberia by putting this field into operation.

Specific tasks to insure utilization, during the development and putting into operation of the field, of the newest achievements of science and technology and highly efficient equipment, broad incorporation of automation and mechanization of production processes, high-quality preparation of gas and gas-condensate at the recovery site for future transport and environmental protection measures have been assigned to USSR ministries and departments.

Thus, Mingazprom [Ministry of the Gas Industry] and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] have been assigned tasks pertinent to the establishment of production capacities for gas and gas-condensate recovery; Minkhimmash [Ministry of Chemical and Petroleum Machine Building], Minpribor [Ministry of Instrument Making, Automation Equipment, and Control Systems], Minenergomash [Ministry of Power Machine Building], Min-

elektrotekhprom [Ministry of the Electrical Equipment Industry] and Minchermet [Ministry of Ferrous Metallurgy] are to produce new types of equipment and tubing of Arctic design for well drilling and field development in permafrost conditions; and USSR Minenergo [Ministry of Power and Electrification] and Mintransstroy [Ministry of Transport Construction] are to build and put transmission lines, electric substations, paved roads and a rail line from Urengoy to Yamburg into operation.

Ahead-of-schedule development of a transportation network, power supply facilities and housing construction are foreseen during construction of the Yamburg gas-condensate field.

The USSR Academy of Sciences, Mingazprom and Ninneftegazstroy have been assigned the task of carrying out a series of scientific and research operations in the Yamburg gas-condensate field to comprehensively study the permafrost and to draw up recommendations for the development of an industrial and social infrastructure in this region.

12659
CSO:1822/446

OIL AND GAS

NEFTECHALA OIL RECOVERY LEVELS MEET PLAN

Baku VYSHKA in Russian 18 Jul 84 p 1

[Article by G. Sakhavatov,"In a Persistent Quest"]

[Excerpts] Neftechala--For the first time in the last 3 years, Neftechalaneft', an NGDU [Oil- and Gas-Extracting Administration] collective, has overcome its lag and has brought oil recovery up to the level of the plan. The petroleum delivery quota for the first half-year has been met by 100 percent.

During the last three years 120 wells have been brought out of shut-down status and more than half of them have been put into operation ahead of schedule.

"That's not the limit of what we can do", says a driller. Having considered their resources and potentialities, the brigade has decided to overhaul 25 more wells before the end of this year and thereby create conditions favorable to the successful fulfillment of the plan and obligations for oil and gas recovery.

The conversation about repair work is not just casual talk. Until recently there was a labor turnover, absenteeism and tardiness here. Many oil wells stood idle for long periods of time because of low labor and production discipline. It was impossible to tolerate such a situation. So the management and the shop's party and labor union organizations undertook an all-out struggle to strengthen the extent of organization and order, using for this a form of influence on people which acted as a personal example of a communist and a mentor.

The Arlan method of evaluation and wages for repair workers can also be used to advantage in old areas where water encroachment and frequent sand bridges have a negative effect on well operation.

"Yes, the quality of well repair is the chief indicator", says Balabek Guliyev, chief engineer of the Neftechalaneft' NGDU. And, too, well shutdowns for repair are used in the fields to conduct geological and technical measures in the wells. Since the beginning of the year, about 300 of them have peen performed, and as a result over 11 thousand additional tons of oil have been recovered. Growth is guaranteed, thanks to the engineering search for reserves. At the end of June we had succeeded in raising the daily recovery level of oil by 30 tons.

12659
CSO: 1822/446

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FORECASTING COLLECTOR PROPERTIES OF DEEP ROCK TRIED

Kiev GEOLOGICHESKIY ZHURNAL in Russian No 5, 1984 (signed to press 6 Sep 84) pp 121-127

[Article by S. M. Kazakova (VNIIneft' [All-Union Scientific-Research Institute for Oil and Gas], Moscow): "Forecasting the Collector Properties of Petroliferous Rocks at Great Depths (in the Example of Upper Carboniferous and Viseyan Sandstones of the Dnepr-Donets Depression)"]

[Text] The information we are presenting is a survey of the collector properties of Carboniferous sandstones at depths of more than 4,000 meters, by way of making an overall statement of the problem [4, 5, 1 and 11]. More than 200 holes with a bottom-hole depth greater than 4,000 meters have been drilled in the Dnepr-Donets depression (DDV). We have used the data on 33 holes in constructing graphs that describe the collectors' porosity and permeability changes. The Carboniferous sediments have been described in greater detail previously [2, 6-8, 4 and 5 and others], so we limit ourself to a brief description of them.

The Lower Carboniferous sediments are marked by great diversity of the rocks. The Tournasian stage is characterized by the development primarily of carbonate and, more rarely, terrigenic (in the DDV's northeast) formations. In the DDV the Viseyan stage is subdivided into Lower Viseyan and Upper Viseyan sediments. The first are primarily carbonates with sandstone interbeds, the second are terrigenic. The oil and gas confined to Viseyan sediments lie at great depths. The Namurian stage in the DDV is marked by a predominance of clayey rocks, which form a cap for the oil and gas deposits in the Viseyan sediments, and only sometimes oil and gas deposits are confined to Namurian collectors.

The Middle Carboniferous sediments in the DDV are represented by the Bashkirian and Moscovian stages. The Bashkirian stage is complicated by Lower Bashkirian argillites, limestones with sandstone interbeds, and Upper Bashkirian sandstones with aleurolite interbeds. Lower Bashkirian sediments are characterized by relatively weak permeability and, together with the Namurian, they form regional caps. The Upper Bashkirian sediments are rich in oil and gas collectors. The Moscovian stage contains good collectors--sandstones interbedded with argillites.

The Upper Carboniferous sediments are distinguished by substantial development of good oil and gas collectors, which are thick sandstones. However, cap rocks are almost nonexistent in the Upper Carboniferous. In those cases where these caps do exist, oil and gas fields are formed in the Upper Carboniferous.

All the stratigraphic subdivisions of the normal DDV profile submerge gradually in the southeast direction--toward the Donbass. Therefore, the shallow rocks which are accessible for study in the northwestern part of the DDV turn out to be deeply submerged toward the southeast. The greatest depths of burial of the crystalline basement are: beside Srebnoye village--7 km, near the city of Poltava--9 km, and close to the Donbass [Donets Coal Basin] (the Lozovaya Railroad Yard)--14 km.

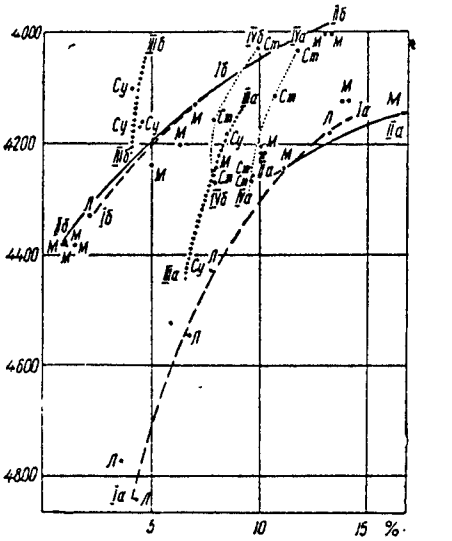
In the deep zones of the DDV's Paleozoic-sediment profile are granular, carbonate and fractured collectors. The granular collectors are terrigenous rocks--from large-grained sandstones to fine aleurolites. Sandstones of medium size and small grain are most widely distributed. An examination of the consistency of change of the sandstones' collector properties as a function of the sandstones' depth of bedding should begin with the younger sediments. They fill up the central graben and those that are more distant from the side fractures, a fact that strongly distorts the picture of consistent change in the porosity and permeability of the rocks as their deposition depths increase. Therefore, we shall successively examine changes in the characteristics of the sandstones of the Upper Carboniferous and Viseyan sediments. Each age of the rock group is characterized by a corresponding graph in which the ordinate axis represents changes in depth of deposition of the collectors and the abscissa represents changes in porosity and permeability of the rocks (figures 1-4). Each analysis is represented on these charts by a corresponding point. Plotting the series of points according to the analytical data can show the behavior of the sandstone collectors for the various holes and areas, by age group as a whole.

The Upper Carboniferous Sandstones. Upper Carboniferous sediments are found at depths of more than 4,000 meters at a number of structures within the Poltava cross-depression. We trace the change in the characteristics of Upper Carboniferous sandstones with increase in the bedding depth in accordance with data for the Lannovskaya and Mashevskaya areas, which are in the relatively static tectonic state that is typical of the middle of the Poltava cross-depression and maximum thickness of the Paleozoic. In figure 1, in drawing the dotted lines through the series of points of Π, we get two boundary lines--Ia and Iδ. They indicate changes in the maximum (curve Ia) and the minimum (curve Iδ) porosity of the sandstones. All the remaining points are located between the boundary lines. The only exception may be the rare samples with anomalously high (the so-called "hurricane") values of sandstone porosity which are caused by loss of cementation of the sandstones along fractures near tectonic fractures. Such "hurricane" anomalies are not encountered within the Lannovskaya and Mashevskaya structures.

The maximum porosity of the Upper Carbonaceous sandstones at the Lannovskaya structure is systematically reduced from 13 percent at a depth of 4,230 meters to 3 percent at 4,800 meters. This gives a reduction in maximum porosity of 10 percent at a depth interval of 570 meters, that is, the gradient

Figure 1. Change of Porosity with Depth of Upper Carboniferous Sediments of the Dnepr-Donets Depression.

The boundary lines of porosity measurements for the structures: the Lannovskaya (Л)--Ia-Ia for the maximum and Iδ-Iδ for the minimum; the Mashevskaya (M)--IIa-IIa and IIδ-IIδ, respectively; the Sukhodolovskaya (Cy)--IIIa-IIIa and IIIδ-IIIδ; and the Staroverovskaya (Ст)--IVa-IVa and IVδ-IVδ.



of reduction of maximum porosity is 1.7 percent per 100 meters of depth. The minimum porosity of Upper Carbonaceous sandstones at the Lannovskaya structure is reduced from 8 percent at a depth of 4,080 meters to 2 percent at 4,340 meters, that is, the gradient of reduction of minimal porosity is 2.3 percent per 100 meters of depth.

In comparing the values of the gradients for reduction in porosity of the Upper Carboniferous sandstones of the Lannovskaya structure, we come to the conclusion that they can be considered almost identifical for its maximum and minimum values. The average value is 2 percent per 100 meters of depth. It is this that explains the parallelism of the lines Ia and Iδ in figure 1.

In examining the changes in permeability (see figure 2), relationships that are basically convergent can be noted. Thus, on uniting the extreme points of Л in figure 2 and getting two boundary lines, we can determine accordingly the amounts of reduction in permeability of the Lannovskaya structure's Upper Carboniferous sandstones. Their maximum permeability changes from 8 md [millidarcies] at a depth of 4,180 meters to 0.1 md at 4,800 meters. This gives 7.9 md at 620 meters, or 1.3 md at 100 meters' depth. The minimum permeability of these same sandstones varies within very small ranges (fractions of a millidarcy).

Moving over to the characteristics of Upper Carboniferous sandstones of the Mashevskaya structures at depths of more than 4 km, we develop the boundary lines IIa and IIδ. The maximum porosity values of the sandstones at the Mashevskaya structure (see figure 1) change from 16.5 percent at a depth of 4,120 meters to 11 percent at 4,240 meters. This gives 5.5 percent for 120 meters, or 4.6 percent for each 100 meters of depth. The minimum porosity of the Mashevskaya structure's Upper Carboniferous sandstones is reduced from 13 percent at a depth of 4,020 meters to 1 percent at 4,380 meters. This gives 12 percent at 360 meters' depth, or 3.3 for each 100 meters of depth. Consequently, porosity is reduced more rapidly with depth than at the Lannovskaya.

In comparing the point fields for the Lannovskaya and Mashevskaya structures, it can be noted that these fields are similar, but their boundary lines are inclined at different angles to the abscissa axis, which also indicates a different speed in reducing sandstone porosity at the different structures. The same thing also applies to the boundary lines of the point fields for the

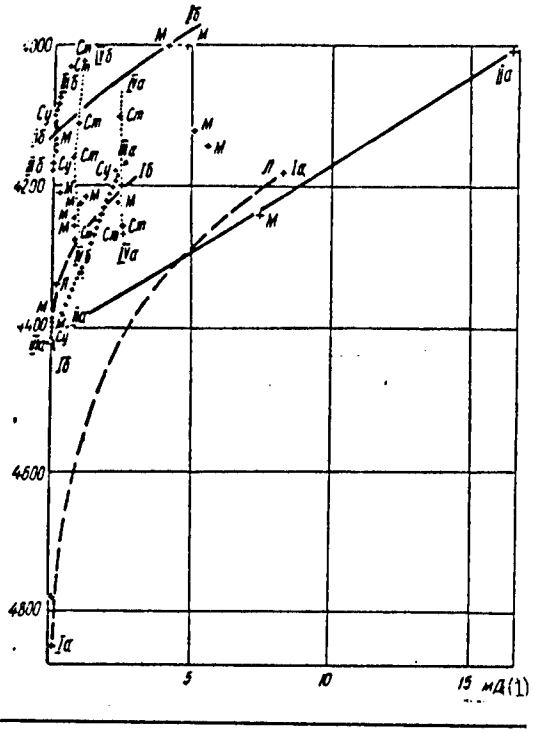


Figure 2. Change of Permeability with Depth of Sandstones of Upper Carboniferous Sediments of the Dnepr-Donets Depression.

The boundary lines of change in permeability for the structures: the Lannovskaya (Л)--maximum Ia-Ia and minimum Iб-Iб; the Mashevskaya (M), respectively, IIa-IIa and IIб-IIб; the Sukhodolovskaya (Cy) IIIa-IIIa and IIIб-IIIб; and the Staroverskaya (Ст) IVa-IVa and IVб-IVб.

Key:

1. Millidarcies.

Sukhodolovskaya (curves IIIa and IIIб) and Staroverovskaya (curves IVa and IVб) structures.

And so the Upper Carbonaceous sandstones in the DDV's central portion are characterized by systematic reduction in their porosity and permeability with depth. These changes occur differently for each structure, but, in general, they are similar. A more intense reduction for minimal porosity than the maximum is noted.

Lower Carboniferous (Viseyan) Sandstones. Viseyan sediments at depths of more than 4,000 meters have been found in the DDV in areas that are located within the Lyutenkovskiy cross-uplift and the Romenskaya cross-depression. It is desirable to describe the Viseyan sandstones in the example of the Chizhevskaya structure, which is located in the northwest termination of the Glinsko-Rozbyshevskiy swell (see figure 3) and has promise for bearing oil and gas [11].

In plotting the data of the analyses (see figure 3) on the graph, one can outline on it a certain field with two boundary lines--Ia (maximum porosity) and Iб(minimum). The maximum porosity of the Viseyan sandstones changes here from

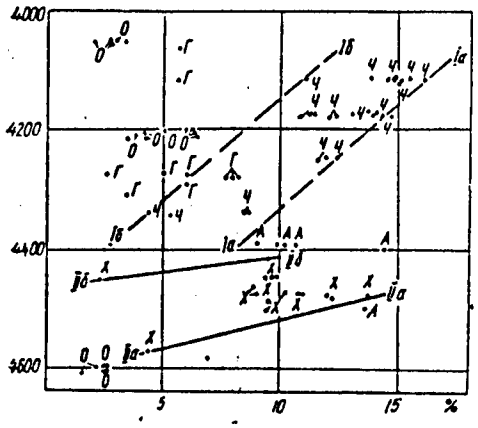


Figure 3. Change in Porosity with Depth of Lower Carboniferous (C_1^V) Sandstone Sediments of the Dnepr-Donets Depression.

Boundary lines of change of porosity for the structures: Chizhevskaya (Ч)--the maximum Ia-Ia and the minimum Iб-Iб; the Khar'kovtsevskaya (Х)--respectively IIa-IIa and IIб-IIб; and О the Oposhnyanskaya structure, А the Anastas'yevskaya, and Г the Gnedintsevskaya.

16.5 percent at a depth of 4,100 meters to 8.5 percent at 4,340 meters. This gives a porosity reduction of 8 percent for 240 meters of depth, or 3.3 percent per 100 meters. The minimum porosity of the sandstones changes from 11 percent at a depth of 4,100 meters to 4 percent at 4,340 meters, that is, the porosity reduction is 7 percent for 240 meters of depth, or 2.9 percent for every 100 meters.

The porosity characteristics obtained for the Viseyan-age sandstones are similar to the corresponding characteristics of the Mashevskaya structure's Upper Carboniferous sandstones. However, the nature of distribution of the points on the graph for the Chizhevskaya structure are completely different from those for the Mashevskaya and Lannovskaya structures. It is evident on the graph of porosity of the Chizhevskaya structure Viseyan sandstones (see figure 3) that the points are located on it in almost horizontal rows. This means that the porosity of the sandstones for the neighboring specimens change sharply at about the very same depth; for example, from 14.5 to 11 percent at depths of 4,170-4,8180 meters and from 9 to 4 percent at depths of 4,320-4,340 meters (see figure 3). All this indicates the phenomena of a loss of cementation of the sandstones in areas where the rocks were crushed during tectonic movements, which were confined to the axial zone of the Glinsko-Rozbyshevskiy swell, at the northwestern continuation of which is the Chizhevskoye oil and gas field. What has been said is also confirmed by a graph of the permeability of Chezhevskaya structure Viseyan sandstones (see figure 4). As we see, sandstone permeability here at depths of 4,170 4,180 meters reaches anomalous--"hurricane"--values (up to 117 millidarcies). At depths of 4,320-4,340 meters, permeability fluctuates sharply--from 3 to 0.2 millidarcies. All this indicates that porosity, and even more so permeability, of the Chizhevskaya structure sandstones are caused mainly by the tectonic rather than the sedimentation factor.

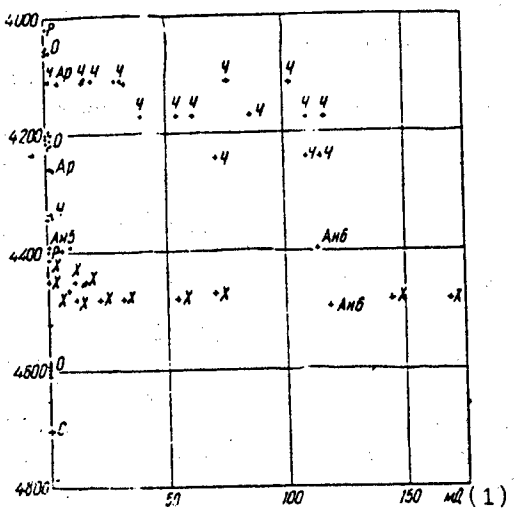


Figure 4. Change of Permeability with Depth of Lower Carboniferous (Viseyan, C_1^V) Sandstones of the Dnepr-Donets Depression.

The structures are: Ap--Artyukhovskaya; Ан--Anastas'yevskaya; О--Oposhnyanskaya; Р--Rudenkovskaya; С--Solokhovskaya; Х--Khar'kovtsevskaya; and Ч --Chizhevskaya.

Key:

1. Millidarcies.

Everything that has been said above is true also for the Khar'kovtsevskaya structure sandstones, which are located at the southeastern termination of the Glinsko-Rozbyshevskiy swell, as if it were symmetrical with the Chizhevskaya. However, at the southeastern termination of the Glinsko-Rozbyshevskiy swell, the influence of the tectonic factor on porosity and

permeability tells more strongly on the Viseyan sandstones than on the Chizhevskaya structure. The porosity (maximum) for Viseyan sandstones of the Khar'kovtsevskaya structure changes from 14 percent at a depth of 4,480 meters to 4 percent at 4,580 meters. In other words, a reduction in maximum porosity of 10 percent per 100 meters of depth is observed. The minimum porosity of these same sandstones changes from 9 percent at a depth of 4,410 meters to 2 percent at 4,450 meters. This gives a reduction in minimum porosity by 7 percent for 40 meters of depth, or 17.5 percent per 100 meters. A rapid reduction has been established here that is almost double the reduction in maximum porosity. All these peculiarities point to the fact that the depth interval analyzed at the Khar'kovtsevskaya structure is one of the deep zones of loss of seal of the rocks. The loss of seal apparently occurred as a result of loss of cementation when sandstones were washed by the ground water that circulates through the fractures and bedding planes.

Similar arguments may be cited also relative to the Viseyan sandstones of the Oposhnyanskaya, Gnedintsevskaya and Anastas'yevskaya structures. It may also be noted that these structures, which are situated either in the side portion of the DDV (the Anastas'yevskaya) or at the cross-uplifts (Oposhnyanskaya and Solokhovskaya--at the Lyutenkovskiy cross-uplift), are sharply distinguished by the pronounced fracture type of porosity and permeability. The points on the graph are located in almost horizontal rows (see figures 3 and 4).

And so the collector properties of the petroliferous rocks change greatly with increase in the depth of their bedding. This results from the catagenesis of the sedimentary rocks with change of their porosity, filtering capabilities, and yield of oil and gas. In examining the porosity of the DDV's Carboniferous sandstones and their development in the catagenetic area, different types of porosity can be singled out: sedimentational (primary) and tectonic (secondary).

The Sedimentational Type is marked by a uniform reduction in porosity and permeability of the sandstones with their bedding depth. Maximal and minimal porosity are reduced in approximately equal measure, but a tendency toward a rapid reduction in minimal porosity is noted. These properties of change in porosity can be explained by the processes of sandstone cementation in deep areas and by the consistent change in the nature of their recementation with depth.

The Tectonic Type is characterized by relatively sharp and large fluctuations in the porosity and permeability of sandstones at nearby depths. Sometimes anomalously high--"hurricane"--values of porosity and permeability are encountered. These properties are explained by tectonic fracturing of the rocks and loss of cementation of the sandstones caused by it. This type of porosity and permeability is characteristic for relatively disturbed tectonic conditions.

In the structures' fracture zones secondary tectonic porosity developed in the form of rudimentary microcracks. In these zones the sandstones lose cement and their secondary porosity grows. Relative homogeneity of the substrate is noted in dense carbonate rocks. Tectonic porosity develops in them along with microdisplacements and along the lines of rock flow. These are

series of S-shaped microcracks disposed in echelon fashion. With change in the direction of the deforming tectonic forces, there is a restructuring of the microtectonic shove and a reforming of the pores into angular and triangular pores and then into multiple-pronged pores. The latter flow together and form microcracks. The development of microtectonic porosity in the sandstones is complicated by differences in the composition of the plastic particles and the cement. Since the material of the particles usually is more simple than the material of the cement, then, under strong directed pressure, there are a reorienting of the particles in the sandstones (especially those of nonuniform granularity) and destruction of the cement in their vicinity. This weakens the ties of the particles with the cement and facilitates the forming of microcracks in the rocks.

The tectonic fracturing that develops from tectonic porosity changes strongly the collector properties of petroliferous rocks, causing anomalously high values of porosity, permeability and yield of oil and gas. Where the particles have slight strength, the cement is stronger, and there is a strong directed pressure, destruction of the particles without breaking their ties with the cement can occur, but this happens rarely.

The rocks' geological age does not play a decisive role in determining their collector properties. The depth of the collectors' bedding and the hydrogeological and geothermal conditions are of decisive importance for sedimentational (primary) porosity. The tectonic setting of the structure and the history of its development, especially the last stages, are extremely important for tectonic porosity and fracturing.

The gradients of reduction in porosity of the sandstones that we have obtained exceed severalfold the values of the gradients computed in accordance with various mathematical formulas [3 and 9]. G. I. Etuoter and I. I. Miller (1980) studied 17,367 core samples (basically Miocene and younger sandstones) taken from holes at 101 fields and from many prospecting holes in the southern part of the state of Louisiana (USA). They established that on the average the deterioration of porosity is marked by a gradient of 4.15 percent per 1 km. J. K. Maxwell generalized data selected from various sources: he also analyzed more than 8,000 samples from formations, from the Ordovician to the Miocene (basically Tertiary) and observed that the gradients of deterioration of porosity are higher at those sections where the geothermal gradients are highest. The porosity gradients varied from 3.28 percent per 1 km for Oligocene sands at a geothermal gradient of 23 degrees C per 1 km to 8.4 percent per 1 km for sands of similar age at a geothermal gradient of 32.8 degrees C per 1 km [10].

The gradients we obtained exceeded severalfold the values of the gradients pointed out by these authors, for various reasons. First, the computed theoretical data had been averaged and did not consider the fluctuations of the specific environments of the various fields at various depth intervals. But these conditions are characterized primarily by definite tectonic conditions of the rock (microfracturing thereof and the loss of cementation of the sandstones caused by it). Second, the gradient values we obtained characterized definite structures and only specific depth intervals. A small number (compared with those presented by the above-indicated authors) of laboratory determinations of porosity and permeability make each of these

determinations random to a certain extent. However, it must always be remembered that randomness is a phenomenon of definite consistency. Therefore, the higher gradients of porosity reduction that we obtained require further study, even if they also do not concur with today's theoretical principles.

The changes in porosity and permeability of sediments with depth that we have found for specific oilfield areas of the DDV can be used successfully when prospecting for and exploring new oil and gas fields and when computing their reserves, and also in potentially petroliferous regions, especially in regions already known ("old" regions), taking into account their lithofacies and the tectonic conditions--in Ciscaucasia, for example.

Summary

Carboniferous sandstones of the Dniepr-Donets depression (DDD) are considered for their porosity and permeability at the depths above 4 km. Sedimentation (primary) and tectonic (secondary) types of porosity are distinguished. The porosity and permeability variations with the depth of occurrence found for the concrete DDD oil fields may be used in prospecting new oil and gas fields in the other regions. [As printed in English.]

BIBLIOGRAPHY

1. Babadagly, V. A., Dem'yanchuk, V. G., Izotova, T. S. and others. "The Forecasting of Granular Collectors of the Lower Carboniferous of the Dnepr-Donets Depression." GEOL. ZHURN. [The Geological Journal], Vol 42, No 4, 1982, pp 11-24.

2. Vossanchuk, S. S. "Litologiya i epigeneticheskiye preobrazovaniya kamennougol'nykh otlozheniy DDV v svyazi s ikh neftegazonosnost'yu" [The Lithology and Epigenetic Transformations of Carboniferous Sediments of the DDV [Dnepr-Donets Depression] in Connection with Their Petroliferousness]. Author's abstract of a dissertation for doctor of geologico-mineralogical sciences. Moscow, 1970, 40 pages.

3. Dobrynin, V. M. "Deformatsii i izmeneniye fizicheskikh svoystv kollektorogo nefti i gaza" [Deformations and Change in Physical Properties of Oil and Gas Collectors]. Moscow, Nedra, 1970, 239 pages.

4. Dolenko, G. N., Kiselev, A. Ye., Lagola, P. M. and Gnidets, V. P. "Consistencies in Change of Granular Collectors and Their Petroliferousness in the Northwestern Part of the DDV, to a Depth of 5.5 Km." GEOL. ZHURN., Vol 42, No 6, 1982, pp 24-32.

5. Dolenko, G. N., Kiselev, A. Ye., Bogayets, A. T. et al. "Consistencies in Change of Rock Collectors and Their Petroliferousness in the Black Sea-Crimea Province, at Depths up to 5.0 Km." Ibid, Vol 45, No 1, 1983, pp 1-19.

6. Kazakova, S. M. "Facies and Petroliferousness Prospects of Sediments of the Middle and Upper Carboniferous of the DDV." Ibid, Vol 33, No 6, 1973, pp 121-126.

7. Kazakova, S. M. "Fatsii i perspektivy neftegazonosnosti nizhnekamennougol'nykh otlozheniy DDV," [Facies and Prospects for Petroliferousness of Lower Carboniferous Sediments of the DDV]. Geologiya i geokhimiya goryuchikh iskopayemykh [Geology and Geochemistry of Fuel Minerals], No 38, 1974, pp 39-48.

8. Kazakova, S. M. and Klimenko, V. Ya. "Paleographic Prerequisites for Petroliferousness of Carboniferous DDV Sediments." GEOL. ZHURN., Vol 42, No 2, 1981, pp 126-131.

9. Proshlyakov, B. K. Vtorichnyye izmeneniya terrigenykh porod-kollektorov nefti i gaza [Secondary Changes of Terrigenic Oil and Gas Rock Collectors]. Moscow, Nedra, 1974, 233 pages.

10. Teylor, Dzh. M. "Kollektory-peschaniki" [Sandstone Collectors]. In the book, Dostizheniya v neftyanoy geologii [Achievements in Oil Geology]. Moscow, Nedra, 1980, pp 148-200.

11. Shpak, P. F. Arsiriy, Yu. A. Bulyk, A. A. and others. "Consistencies in the Distribution of and Prospects and Directions for Prospecting for Large and Medium-Size Oil and Gas Fields in the DDV." GEOL. ZHURN., Vol 42, No 1, 1982, pp 1-12.

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WAYS TO IMPROVE OIL, GAS EXPLORATION IN TURKMENISTAN NAMED

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 3, 1984 (signed to press 10 Aug 84) pp 72-76

[Article by Ch. M. Paytykov (TurkmenNIGRI [Turkmen Scientific-Research Institute for Geological Exploration]): "The Problem of Increasing the Effectiveness of Prospecting and Exploration for Oil and Gas in Turkmenistan"]

[Text] A broad set of operations for geological exploration for oil and gas has been performed in recent years in the Turkmen SSR. This is explained, on the one hand, by the potential of this land in terms of hydrocarbon raw materials, and, on the other, by the vigorous development of the gas industry. Suffice it to say that Turkmenistan has reached second place in the country in gas recovery.

During the 10th Five-Year Plan a large amount of prospecting for oil and gas fields was done on the republic's promising lands. Sixty-three promising structures were prepared for deep drilling, about 1.2 million meters of deep drilling were completed, and 48 local folds were put to the drill. Vast geological information was obtained that allowed the land's promise in terms of oil and gas to be assessed with greater reliability, prospecting and exploration to be conducted with greater validity and purposefulness, and a number of fields and deposits to be discovered (table 1). An indubitable success of prospecting and exploration in these years was discovery of the Uchadzhi gas-bearing area, which is of principal importance. As is known, the prospects of the Neocomian sediments of the Murgab depression's vast lands, which are located east of the Murgab fault, were for many years a topic of spirited discussion. The consequence of this was that this vast territory, which had a substantial inventory of prepared structures, was not covered by deep drilling. The discovery in 1978 of the Uchadzhi gas field confirmed the correctness of the researchers who had assessed highly the prospects of "the Shatlyk horizon" also in this part of the Murgab depression. Six structure here were put to deep drilling, from which commercial gas flows were obtained at five (Uchadzhi, Vostochnyy Uchadzhi, Seyrab, Beshkizil and Yashlar).

An important result of the geological exploration was the appearance of commercial flows of hydrocarbons from subsalt sediments of the Murgab depression (Yashlar and Sandykachi). The prospects for these sediments has been assessed highly by all researchers, and practice confirms this assessment. Since the

Table 1

Fields Discovered in Turkmenistan During 1976-1980

Field	Type	Year of discovery		Type	Year of discovery
Mollaker.....	Gas condensate	1976	Gagarinskoye.....	Gas	1978
			Vostochnyy Cheleken	Oil and gas	1978
Kapa-Tepe.....	Gas	1977	Yashlar.....	Gas and oil	1979
Vostochnyy Tedzhen	Gas	1976	Sandykachi.....	Gas	1979
Keymir.....	Gas	1977	Vostochnyy Uchadzhi	Gas	1979
Ekiz-Ak.....	Gas	1977	Karadzhaulak.....	Gas	1979
Shorkel'.....	Gas	1978	Beshkizil.....	Gas	1980
Malay.....	Gas	1978	Yuzhnoye Bugdayli..	Gas	1980
Uchadzhi.....	Gas	1978			
Seyrab.....	Gas	1978			

subsalt carbonate sediments of the Murgab depression will, during the 11th Five-Year Plan and over the long term, be one of the main targets of prospecting and exploration, the results obtained are difficult to overestimate. It should also be noted that at the Yashlar area, flows of light crude, along with gas, also were obtained. This means that the subsalt complex may be not only gas-bearing but also oil-bearing, and such a result, given the prevailing situation in the republic's oil-recovery industry, would be extremely important. The first results of deep drilling in the Beshkent trough indicate that its lands can now, during the 11th Five-Year Plan, become a new oil and gas bearing zone of the republic. During the 10th Five-Year Plan, the gas-bearing area of the Dauletabad-Donmez field was greatly expanded.

Commercial flows of gas obtained from Neocomian sediments in the Amu-Darya depression (the Malay area) compel reevaluation of the prospects of the more northerly Repetek-Cheshmin deep fault.

As before, the main amounts of work on oil in the region were performed in the republic's west (the Apsheronian-Balkhan and West Turkmen petroliferous areas) and were concentrated along three main directions: the upper red beds--the Akchagylian and Apsheronian sediments of the Balkhan uplift zone; the lower red bed sediments of the Balkhan zone; and Pliocene sediments of the Gograndag-Okarem uplift zone.

The worsening of effectiveness in prospecting and exploring for oil in the republic is explained by many factors, chief of which are: the high degree to which the main petroliferous complex--the upper red beds of the Balkhan region--had been explored; the greater depths of deposition of the lower red bed sediments, and their collector properties, which are poorer than those of the upper red beds; and the presence primarily of gas in the Pliocene sediments of the Gograndag-Okarem region; the sharp reduction in prospecting and exploration drilling volume that resulted from nonfulfillment of the planned amounts of work (1,188,000 meters were drilled through during the Eighth Five-Year Plan, 690,000 during the Ninth and 500,000 during the 10th). There are still a number of deficiencies that adversely affect prospecting and exploration effectiveness--primarily nonfulfillment of the drilling plan (83.3

percent). During the 10th Five-Year Plan 238,000 meters of penetration were not performed. The amount of drilling performed remains low. An increase in geological-exploration effectiveness depends upon the following factors.

1. An increase in productive time during drilling and a reduction of idle time. The main causes of idle time are the poor and delayed furnishing of supplies and equipment, the same faults in organizing drilling work, and personnel turnover. Eliminating these deficiencies will increase productive time during drilling.

2. Accidents greatly reduce drilling productivity and effectiveness. Despite a reduction in their number, total time losses during the 10th Five-Year Plan rose to 651 rig-months. It is obvious that a reduction in the accident rate is an important reserve for increasing labor productivity. Moreover, eliminating accidents requires substantial material and financial expenditures, which, in the final analysis, will increase drilling costs.

Studies have indicated that most accidents occur through the fault of the operators. Thus, out of 28 accidents that occurred in 1977-1978 in East Turkmen areas, 26 were the fault of the drilling brigades. Losses from these accidents alone were 467,000 rubles, and losses in penetration were 37,000 meters. Considering that hole depths have risen greatly during this five-year plan, the remediation of accidents requires great expenditures of both time and material resources.

3. The share of wells eliminated for technical reasons is substantial. During the 10th Five-Year Plan 48 deep holes were eliminated, the total cost of which was 73 million rubles, and the penetration was 159,000 meters. The elimination of holes for technical reasons, aside from the purely financial and material losses, often delays the completion of various geological tasks and increases the time spent prospecting for and exploring fields, which, after all, reduces the geological and economic effectiveness of prospecting and exploration.

4. Such promising areas as the Beshkent, Zaunguz, Karabekaul and Ilim trough were not covered by the operations because of the uneven siting of key and appraisal holes on the republic's land. This is explained by the fact that key and appraisal holes are drilled only by the Turkmen SSR Geological Administration and Turkmenneft' Association, which concentrate their work in the areas of their activity, a fact that is completely justified even from the economic point of view. The opinion that drilling key and appraisal holes on the republic's land should be done by the UG [Geological Administration] of the Turkmen SSR is wrong and does not meet today's requirements, for the following reasons: UG TSSR does not have drilling organizations in the regions where such holes must be drilled; and the establishment of drilling organizations in these regions for drilling 2-3 key and appraisal holes is uneconomical. Because of this, such holes should be drilled by the nearest drilling organization, regardless of its agency subordination.

5. The sequence in stages of the geological-exploration cycle is being violated. Thus, for example, prospecting and exploratory drilling were done first in the Uchadzhi region (Uchadzhi, Kulach and Vostochnoye Uchadzhi) and then an appraisal hole (Yashlar) was drilled. In the Beshkent petroliferous area, in the eastern part of the Ciskopetdag petroliferous region, prospecting and exploratory drilling was started without the preliminary drilling of appraisal holes.

6. The geological effectiveness of key and appraisal holes is reduced considerably because of inadequate drilling depths: their adverage depth is less than that of prospecting and exploration holes. Of 50 key and appraisal holes made during the past 10 years, only 7 were more than 4,000 meters deep.

7. A portion of the structures found and prepared prior to the period being analyzed is located on lands which, as a result of drilling, have been evaluated as unpromising or poorly promising. On the one hand, this indicates that second-stage work--detailed prospecting (the discovery and preparation of structures)--was performed in these areas ahead of schedule, without a preliminary assessment of the prospects that the land or a complex of sediments was petroliferous (which is the job of key and appraisal drilling). On the other hand, this raises such questions as establishment of the speed of discovery and preparation of structures as a function of the results of regional operations. It is hardly desirable to promote detailed prospecting without obtaining commercial flows of hydrocarbons at the regional-operations stage. When the results of drilling are positive, the matter of the optimal number of structures to be reprepared also is urgent. Over the years, the accuracy and intensity of geophysical research have been increased through the use of new geophysical equipment and work methods. This leads to repreparation of structures. Thus, for example, some of the structures prepared by MOV's [reflected wave methods] in previous years (Yalany, Bayram-Ali, Severnyy Chesme, Yuzhnyy Unguz and others) were reprepared by the expensive OGT [common depth point] method because of incompleteness of the data on the subsalt portion of the profile and incompleteness of their introduction into development. Repreparation of a large number of structures in East Turkmenistan by the OGT method is also planned for deep horizons over the long term. Therefore, in areas of petroliferous promise at which petroliferousness has been proved and where there is an existing, adequate inventory of prepared structures, the main task of the detailed prospecting stage is the maximum discovery of local uplifts.

8. The low coefficient of successfulness in deep drilling testifies that validation of the prospects of structures that are recommended for drilling and the quality of hole penetration and of sampling must be improved. The practice of going to work in areas not prepared for drilling (Seytli, Shokhrat, Yalkym, Khumly, Davali, and so on) affects adversely the coefficient of success.

In recent years it has become the practice to proceed with drilling at a promising area with two or even three rigs. Such an approach has both positive and negative aspects. The large number of rigs speeds up assessment of a structure's promise of petroliferousness. But on the other hand, a larger number of holes is used to obtain negative results for the assessment.

Going to work in an area with several rigs occurs, for example, in the Murgab depression. All the known fields here are now associated with sandstones of the Hauterivian (the Shatlyk horizon), and all of them are single-formation fields. The structures are simple, as a rule, uncomplicated by tectonic disturbances. Of 27 structures drilled over within the Murgab depression, 15 proved to be fields and 12 were unpromising for the "Shatlyk horizon." And all the fields were discovered by the first hole (table 2). The Mayskoye and

Table 2

The Number of Holes for Evaluating a Structure in the Murgab Oil and Gas Bearing Area

Designation of the field	Number of holes	Barren structures	Number of holes
Mayskoye	3	Repetek	3
Bayram-Li	3	Severo-Bayram-Li	1
Sharapli	1	Maryy	3
Keliy	1	Tarkhan	1
Yelan	1	Vostochno-Yelan	3
Shakhitli	1	Iolatan	2
Dzhudzhukli	1	Yuzhno-Iolatan	5
Mollaker	1	Karakel	4
Tedzhen	1	Saryyazy	1
Vostochno-Tedzhen	1	Sandykachi	1
Donmez	1	Yulduz	4
Uchadzhi	1	Kulach	3
Shorkel	1		
Seyrab	1		
Beshkizil	1		

Bayram-Li fields are exceptions. This anomaly is explained by the fact that these areas were the first targets introduced to deep drilling. Information about the geological structure and petroliferousness when drilling was organized was not great. The drilling of two, three, four and five holes at the remaining structures did not lead to any discoveries at all. That means that when evaluating the productiveness of structures in the Murgab depression for the "Shatlyk horizon," one, or a maximum of two prospecting holes is sufficient. Working an area with one rig holds back prospecting progress. A variant whereby 2-3 holes are sunk simultaneously at the structure, provided that at least one is sunk into the underlying Callovian-Oxfordian and, to the extent possible, also into the Lower and Middle Jurassic sediments, can be an alternative to this. Considering that the potential reserves of the Upper Jurassic carbonate sediments of the Murgab depression are great (this is confirmed by commercial flows of hydrocarbons at the Sandykachi and Yashlar areas), the probability of finding fields under such an arrangement is doubled. Aside from this, performing this work will enable geological information about these sediments to be obtained. This can serve later in substantiating the conduct of prospecting at them. This route is the most optimal one at present.

Thus, elimination of the indicated deficiencies and negative factors in operation of the republic's drilling organizations is a considerable reserve for increasing labor productivity and the geological and economic effectiveness of prospecting and exploration.

Conclusions

Oil and gas operating effectiveness can be raised by the rational siting of key and appraisal holes, an increase in their depth, and observance of the prescribed stages for geological exploration, and also by realization of reserves that are available for deep drilling.

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WEST TURKMENIA DEPRESSION POSSIBLY PETROLIFEROUS

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY ASSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 3, 1984 (signed to press 10 Aug 84) pp 62-65

[Article by V. F. Borzasekov and S. I. Gusarova (TurkmenNIGRI [Turkmen Scientific-Research Institute for Geological Exploration]): "The Hydrodynamic Characteristics of the Main Areas of Oil and Gas Accumulation of Southwest Turkmenistan"]

[Text] As is known, the forming and the destruction of oil and gas deposits in the ground are linked with an aqueous environment and are caused to a great extent by the dynamics of the ground water, so a study of the hydrodynamic environment is of great practical importance in identifying regional zones of oil and gas accumulation.

In accordance with the results of geological, hydrogeological and geochemical research in the West Turkmen depression, three main zones of oil and gas accumulation are singled out there which are confined to the Balkhan and Gograndag-Okarem uplift zones and to the lands of the Kyzyl Kum trough.

The West Turkmen depression is complicated by thick Neogene and Quarternary sediments. Four petroliferous complexes are singled out in the profile of Neogene sediments: the lower red beds, the upper red beds, the Akchagylian and the Apsheronian [5 and 6].

Questions of the modern dynamics of Pliocene sediment ground water have been examined by many researchers and become controversial. Such researchers as Yu. V. Dobrov, G. A. Borshchevskiy, M. Ye. Al'tovskiy and others, based upon the common hydrogeological concept of the existence of a West Turkmen artesian basin, noted water movement throughout the Mesozoic sediments complex, from south to north, from the fold-mountain fringe to the Balkhan uplift zone, where the waters had been introduced into Pliocene sediments through a system of fractures [1 and 3-6].

In studying the hydrodynamic regime of Pliocene sediments of the West Turkestan petroliferous area, V. V. Kolodiy [5] established the presence of an elision-type water drive system throughout the whole history of the hydrogeological development of the area being examined. Schemes of the paleohydrodynamic

environment and the modern dynamics of the ground waters of the Middle Pliocene sediments that formed them emphasize the fall in heads from the area of maximum sag to the periphery of the West Turkmen depression, from the Caspian's water area to the fold-mountain fringe. V. V. Kolodiy's schemes are based upon calculations of the pressures at one point for each area, so they reflect only the regional nature of the changes in heads, without emphasizing the local peculiarities of the hydrodynamic regime of each structure.

Based upon a large amount of factual information, we called for a study of the modern hydrodynamic conditions of Pliocene-sediment petroliferous complexes in connection with the forming of the oil and gas deposits within the West Turkmen depression. In order to determine the modern hydrodynamic conditions, the nature of the distribution of formation pressures within each structure and for each water-bearing complex was analyzed. Hydrodynamic maps of two kinds were compiled: of the piezometric surface and the piezometric levels (according to A. I. Silina-Bekchurin's method), which enabled the modern hydrodynamic peculiarities of the water-bearing complexes to be found. Both types of maps proved to be identical in terms of the nature of the distribution of heads in the water-bearing complexes. Because of this, the modern hydrodynamic conditions of Southwest Turkestan Pliocene sediments are illustrated only by maps of the piezometric surface.

During the construction of such maps, the position of the piezometric level was computed at each observation point in accordance with the formula $H = 10P_{пл} s.f.$, where H is the absolute grade of the piezometric level (in meters); $P_{пл}$ is the formation pressure (Pa); and s.f. is the absolute grade of the middle of the filter (in meters).

The lower red beds water-bearing complex, according to the map of the piezometric surface, is marked by a regional reduction in head from the area of maximum sag to the periphery of the depression (figure 1). Toward the north and west edges of the basin, the grades of the piezometric surface are reduced to 400 meters and lower. The western part of the Kelkor trough is singled out by a regional rise in the piezometric surface (more than 1,200 meters). The edaphic piezominima are recorded at Balkhan uplift zone (Cheleken and Koturtepe) and Erdekli area structures, the piezomaxima at Kuydzhik-Boyadag and Gograndag structures. A characteristic feature of the hydrodynamic environment of the lower red bed water-bearing complex is the length of the high-pressure zone far beyond the limit of the modern Kyzyl Kum trough right up to the eastern closure of the Balkhan uplift zone.

Basically the same general hydrodynamic-environment features that are characteristic of the lower red beds are characteristic also of the upper red bed water-bearing complex (figure 2). In the regional layout, a reduction is noted in the piezometric surface from the area of the maximum sag (the water area of the Caspian and the Kyzul Kum trough), where the piezometric levels are maximum (more than 900 meters), to the northern and eastern peripheries of the West Turkmen depression (less than 100 meters). The area of the Kelkor trough also is singled out by a zone of relatively high values for the grades of the piezometric surface (more than 500 meters). On the map of the piezometric surface, voluminous piezominima cover the Cheleken-Koturtepe and

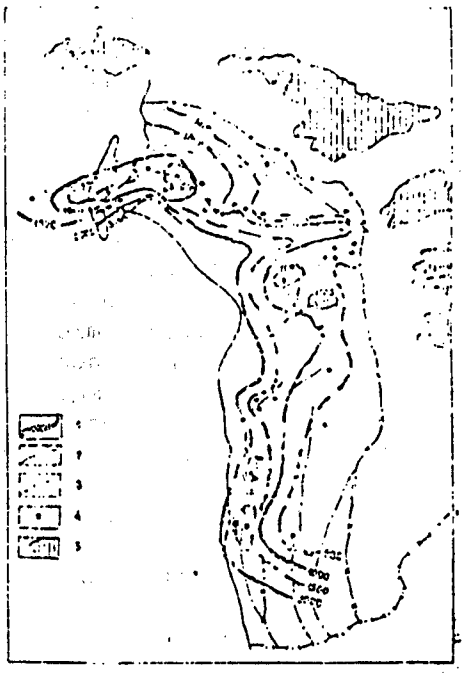


Figure 1. Schematic Map of the Piezometric Surface of the Lower Red Bed Water-Bearing Complex:

1. Isolines of the water-bearing complex's piezometric surface.
2. Tectonic dislocations.
3. Edge of spread of the water-bearing complex.
4. Holes at which the piezometric levels were computed.
5. The fold-mountain fringe.

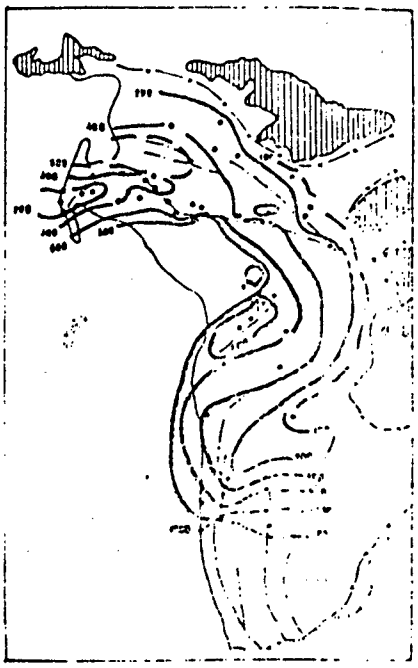


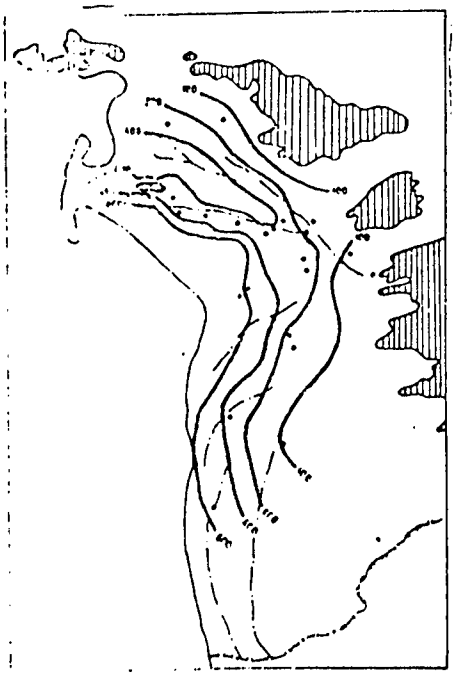
Figure 2. Schematic Map of the Piezometric Surface and the Upper Red Bed Water-Bearing Complex (the conventional signs are the same as for figure 1).

Gograndag-Karadashly areas, and edaphic piezominima are recorded also at the Monzhukly and Erdekli structures. A characteristic feature of the upper red bed water-bearing complex is the growth in values of the heads in the southern direction.

The Akchagylian water-bearing complex also is marked by a consistent lowering of the piezometric surface, from the area of maximum sag to the depression's periphery (figure 3). Edaphic piezominima are recorded on the piezometric surface only at the Koturtepe structure. Also for this complex, the Kelkor trough is singled out by a zone of increased values for the grades of the piezometric surface (more than 400 meters).

An analysis of the maps that characterize the modern hydrodynamic situation of all the water-bearing complexes will enable the following conclusions to be drawn.

Figure 3. Schematic Map of the Piezometric Surface of the Akchagylian Water-Bearing Complex (the conventional signs are the same as for figure 1).



1. The West Turkmen petroliferous basin, in the modern hydrodynamic environment, is an elision water-head system, the drop in heads in which trend from the areas of maximum sag to the basin's periphery and to the area of the fold-mountain fringe.

2. The piezominima that have been found within the various folds of the Balkhan and Gograndag-Okarem regions (Cheleken, Koturtepe, Monzhukly, Erdekli, Gograndag, Karadashli and, probably, others) testify to the discharge of fluids from this complex into the overlying sediments. The piezomaxima recorded (Kuydzhik, Boyadag, Gograndag, Okarem and Keymir) point to the penetration of fluids into this complex from underlying sediments.

3. Throughout the three water-bearing complexes (the lower red beds, the upper red bed and the Akchagylian), the Kelkor trough is singled out by a regional zone of higher heads, which can indicate an additional source of fluids that move toward the Balkhan uplift zone.

4. In accordance with the hydrodynamic characteristics of the water-bearing complexes in the lands of the West Turkmen depression, the following regions are singled out: the Kyzyl Kum, which includes the water area of the Caspian and the Kyzyl Kum trough, with the maximum values of the heads that are characteristic of them; the Balkhan and Gograndag-Okarem, within which edaphic piezominima and maxima have been observed that testify to a vertical cross-flow of fluids between the water-bearing complexes; the Kelkor, which is located within the trough and the depression's northern side, which is adjacent to it, and is characterized by a regional piezometric positive anomaly in the trough and by a consistent fall in the value of the head in the direction of the mountain structures of the Kubadag and the Bolshoy Balkhan; and the Shakhman, which embraces the eastern periphery of the depression between the Gograndag-Okarem and the Aladag-Messerian uplift regions and is characterized also by a consistent reduction of heads in the direction of the fold-mountain fringe.

An assessment of prospects that Pliocene sediments are petroliferous is based upon an analysis of the hydrodynamic regime over the course of the entire history of the West Turkmen depression's hydrogeological development.

Reconstruction of the paleohydrogeological environment of the West Turkmen depression permits the assumption that favorable conditions for the forming of hydrocarbon accumulations in Pliocene sediments existed during the whole history of the hydrogeological development of the area being studied. The paleohydrogeological conditions were characterized by a drop in heads from the area

of maximum sagging toward the periphery of the depression. Within the Balkhan and Gograndag-Okarem uplift zones, edaphic paleopiezominima and minima of squeezed-out water were found, which indicate processes of hydrocarbon accumulation. The modern hydrodynamic conditions of Pliocene deposits also are favorable for forming and preserving hydrocarbon deposits. For petroliferous complexes, the drop in head trends from the area of maximum sag (the generation of hydrocarbons) to the Balkhan and Gograndag-Okarem areas of oil and gas accumulation, within which there are local piezominima and active mud volcanoes, which are viewed as agents for the vertical crossflow of hydrocarbons.

Analysis of the hydrodynamic situation for the forming and distribution of hydrocarbon deposits within the West Turkmen depression indicated that traps of the Kyzyl Kum, Balkhan and Gograndag-Okarem regions should have the best prospects for petroliferousness.

The piezominima of the Balkhan and Gograndag-Okarem uplift zones, which have existed for a long time, probably were a barrier for the further lateral migration of hydrocarbons from the area of maximal sag of the depression. In this connection, the discovery of new oil and gas fields in Pliocene deposits of the West Turkmen depression (the Kelkor and Shakhman regions) edge zones is possible in areas with favorable conditions for the vertical crossflow of fluids from underlying sediment complexes.

Conclusions

1. The characteristics of the hydrodynamic environment of the main zones of oil and gas accumulation in Pliocene sediments of Southwest Turkmenistan have been discovered.

2. An evaluation of the prospects for petroliferousness of the territory has been given in accordance with hydrodynamic criteria.

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BIBLIOGRAPHY

1. Al'tovskiy, M. Ye., Bykova, B. L., Kuznetsova, Z. I. and Shvets, V. M. "Organicheskiye veshchestva i mikroflora podzemnykh vod i ikh znacheniye v protsessakh neftegazoobrazovaniya" [Organic Substances and Microflor of Ground Waters and Their Significance in the Forming of Oil and Gas]. Leningrad: Gostoptekhizdat, 1962.

2. Borzasekov, V. F. "Paleohydrogeological Conditions for the Forming of Oil and Gas Fields of Southwest Turkmenistan." In the book: "Geologiya i neftegazonosnost' Turkmenistana" [The Geology and Petroliferousness of Turkmenistan]. Ashkhabad: Ylym, 1979, No 5.

3. Borshchevskiy, G. A. "Hydrogeological Research for Oil and Gas in Unison with Prospecting and Exploration." In the book: "Perspektivy neftegazonosnosti i napravleniye geologorazvedochnykh rabot v Zapadnykh rayonakh Sredney Azii" [Prospects for Petroliferousness and the Trend of Geological Exploration in the Western Regions of Central Asia]. Leningrad: Gostoptekhizdat, 1960.

4. Dobrov, Yu. V. "Origin of the Water of Southwest Turkmenia's Oilfields." IZV. AN TSSR. SER. FIZ.-TEKH., KHIM. I GEOL. NAUK [Herald of the Turkmen SSR Academy of Sciences. Engineering Physics, Chemical and Geological Sciences Series], No 5, 1969.

5. Kolodiy, V. A. "Gidrogeologiya pliotsenovykh otlozheniy Zapadno-Turkmenskoy neftegazonosnoy oblasti" [Hydrogeology of Pliocene Sediments of the West Turkmen Petroliferous Area]. Moscow: Nedra, 1969.

6. Kurbanmuradov, A. "Glubokiye vody Yugo-Zapadnogo Turkmenistana i perspektivy neftegazonosnosti" [The Deep Waters of Southwest Turkmenistan and the Prospects for Petroliferousness]. Ashkhabad: Izd-vo AN TSSR, 1963.

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SUGGESTIONS FOR CASPIAN OIL OUTPUT INCREASE CITED

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 7, Jul 84 pp 28-29

[Article by A. Derepaskin, chief of the Department of Supervision in the Oil and Gas Extracting Industry and Geology of Gosgortekhnadzor [State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision] of Kazakh SSR, and G. Larin, chief engineer of the Western-Kazakhstan Okrug of the KaSSR Gosgortekhnadzor: "On the Road to the Riches of the Caspian Basin"]

[Text] The 26th CPSU Congress has demanded the implementation of measures for the discovery of new oil and gas deposits in the KazSSR region, and the attainment of annual oil recovery levels for the republic of up to 30 million tons. To this end, the volume of geological and geophysical and exploratory operations has been sharply increased in the Western Kazakhstan region, especially in the Caspian basin.

As a result, the Astrakhan, Karachaganak, Zhanazhol, Tengiz and other oil and gas, and oil and gas condensate fields were discovered. Oil and gas accumulation areas shaped like a relatively narrow wheel with a diameter of about 100 km have been discovered within the most elevated banked areas of the Caspian basin, and encircling the region of the oil- and gas-bearing basin. In addition to the already discovered fields, there are still many promising areas within the wheel where exploratory operations can be carried out.

In 1982 a state commission of experts reappraised potential hydrocarbon reserves. As a result, the figure for reserves at depths of up to 5 km turned out to be 12 percent greater than previous estimates, and expected reserves for depths of up to 7 km have been increased by 2.5-fold. This stimulates further expansion of the exploration and prospecting operations front.

A significant increase in total reserves of hydrocarbon resources is foreseen in the Caspian basin during the 11th Five-Year Plan.

We know that geophysical operations play an important role in oil and gas exploration, and that first among them is seismic survey. It gives very good results in areas where the strata occur relatively orderly or slope gently. But in the Caspian basin the rock formations have, because of the

salinedome tectonics, steeply dipping, and occasionally vertical interfaces. Seismic survey quality is noticeably lowered, especially when studying deep-seated, so-called sub-salt deposits, which are the richest in hydrocarbons.

So the mineral prospectors were faced with the insuperable problem of the reliability of their data. This puts the problem of accelerating development of new methods of voluminous seismic survey, and the establishment of seismic instrument stations with 200 and more channels before the scientific organizations and industrial workers of the USSR ministries of geology and the petroleum industry. The assimilation into practice of high-resolution seismic survey makes possible a re-creation not only of a geometric map of the structure and mutual distribution of strata, but also a determination of their properties and qualitative composition.

Geophysicists have great opportunities for a long-range study of the geological section with the help of electromagnetic prospecting. Unfortunately, this method is not seeing growth, though in our situation it would be inestimably profitable.

We consider the acceleration of the development and assimilation into practice by geophysicists of a method of electromagnetic survey, using high-energy sources, to be of utmost importance. With its help we will be able to determine collecting properties and distinguish porous, high-capacity strata, and even the low-capacity strata which occur at depths of up to 10 km.

The rapid growth of geological and exploratory operations is accompanied by an increase in their volume. During the 10th Five-Year Plan, 1,835,000 meters were drilled in the Caspian oil-producing province. Rates are increasing during the 11th Five-Year Plan. However, drilling is being carried out in difficult geological conditions in the mountains. Among other things the plastic fluidity of the salt-bearing deposits and the clays of the Lower Permian deposits render the flow strings inoperative, seize up the drilling tools and lead to other breakdowns.

In the Caspian, wells are now completed by construction, for the most part at depths of 4-5 km. But according to predicted estimates 70 percent of the oil and gas reserves are concentrated at depths of 5-7 km. However, our domestic industry is not yet manufacturing rigs capable of drilling to such depths.

To keep from inhibiting the development of geological and exploratory operations, the USSR Ministry of Heavy Machine Building should organize construction of rigs for drilling to depths of 6-7 km and more.

During exploration operations logging sondes, bottom-hole pressure gages, thermometers, sampler units and other instruments must be lowered into the wells to determine the characteristics of the oil-bearing strata. But formation pressure and temperature increase with depth. For this, a heat- and pressure-resistant instrument, designed for formation pressures of up to

100 mPa and temperatures of up to 200°C, is required. Up to now such an instrument has not yet been put into series production, since operations have not been carried out in oil-producing regions with pay zones occurring at such depths.

The government has charged the Ministry of Chemical (and Petroleum) Machine Building USSR [Minkhimmash] with implementing the development and manufacture of wellhead equipment, tools and instruments for downhole operations in fields with abnormally high formation pressure and temperature. But for now we have to use imported instruments.

Hydrogen sulfide and carbon dioxide present serious difficulties for geologists and drillers. These gases are contained in the associated and natural gas of subsalt deposits. The maximum allowable concentration of hydrogen sulfide in the air of a work area is 10 mg/m^3, and up to 0.008 mg/m^3 in populated areas. At higher hydrogen sulfide concentrations drilling equipment and instrumentation, in normal use, is quickly damaged. This can lead to major breakdowns and blowouts.

The degree of danger from oil-gas blowouts can be assessed on the example of the newly discovered Tengiz oil field, which is characterized by an abnormal formation pressure of up to 90 mPa, a gas content of up to 600 m^3/t and hydrogen sulfide content in excess of 20 percent (by volume) in the associated (wellhead) gas.

For work in Tengiz-type fields, we need equipment, tools and instrumentation of a special corrosion-resistant design which our domestic industry does not manufacture. This forces oil- and gas-extracting enterprises to acquire them abroad.

The scarcity of corrosion-resistant drill pipe, casing pipe, oil well tubing and blowout preventer equipment is felt sharply in fields with high hydrogen sulfide content. Drilling rigs in such fields have no automatic gas analysers for hydrogen sulfide and are insufficiently provided with hydrogen sulfide neutralizing additives for drilling mud.

In 1974 the USSR Ministry of Geology [Mingeo SSSR] and the Ministry of the Petroleum Industry [Minnefteprom] approved quotas for equipping deep-well drilling rigs with mechanisms, devices and instruments to increase safety. However, at many sites these allocations have not yet been fulfilled, or have been incompletely fulfilled. Devices which shut off drilling mud pumps when maximum allowable pressure is reached in the mud injection line, devices for the automatic refilling of wells during hoisting of drill tools and appliances for drying air in pneumatic system connections etc., have not been developed nor are they in series production.

Other equipment, such as explosion-protected 12-volt portable hand lamps, an intercom between the driller's position, the derrickman's platform and the pump house, a device for hoisting workers up to the various derrick platforms, torque meters for making up drill pipe and casing threads, a traveling cradle for the derrickman, centralizers for lowering in casing strings

and many other devices, have all been accepted for series production and are badly needed by the enterprises, but are not being manufactured. The fact is, that the ministries did not attend to the prompt distribution of orders to plants.

The non-provision of series instruments and equipment to the drilling enterprises makes necessary the fashioning of a variety of homemade devices which do not give desired results and do not guarantee safe work because of nonconformity to established standards.

It is high time for Mingeo USSR and Minnefteprom USSR to review the quotas for equipping drilling rigs with instruments, equipment and mechanisms, and to take the necessary measures for their certain manufacture and delivery to the drilling enterprises.

Over 20 production and scientific and research collectives of three Union ministries--Mingeo, Minnefteprom and Mingazprom are participating in the realization of the program to speed up the growth of regional geological and geophysical, and geological and exploratory operations in the Caspian. Of them, nine are geophysical and eight are drilling collectives.

It seems to us that the time has come to examine the problem of an efficient organizational structure and a system of administration with all types of oil and gas operations in the Caspian basin similar to that which was solved during exploration and operation of the Western Siberian field.

We need to set up two main administrations for the Western Kazakhstan region: one for exploration of oil and gas fields, and the second for recovery. Already existing oil and gas exploration and recovery associations are harmoniously joining ranks in these administrations.

Resolution of the indicated problems will further the fulfilling of tasks to develop the oil and gas industry in Western Kazakhstan.

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OILFIELD MECHANIC SHORTAGES DISCUSSED

Ashkhabad TURKMENSKAYA ISKRA in Russian 14 Aug 84 p 2

[Article by D. Khodzha-Mukhammed, senior instructor, Turkmen Polytechnical Institute Department of Oil and Gas Field Development: "Problems and Opinions. Who Is to Maintain Equipment?"]

[Text] The Turkmen Polytechnical Institute [TPI] is a basic educational institution for graduating engineering personnel for the republic's oil and gas industry. During its 23 years, the petroleum department has trained a huge number of petroleum engineers, drillers, gas workers and hydrogeologists who are successfully working in the gas and oil fields, scientific and research and planning institutes and in other organizations of the republic.

One of the main demands made on specialists of a given field is a thorough knowledge of equipment. A great number of machines and equipment are used in the process of exploration, development, extraction, and storage and transport of oil and gas, including equipment for flow, compression and downhole pumping methods of petroleum extraction, for hydraulic formation fracturing, underground repair and sealing of wells etc.

And this is far from a complete list of equipment used in oil and gas field development. Improved and powerful equipment is utilized in the exploration, drilling and extraction of oil and gas as productive horizons occur at increasing depths. In connection with this, the question of the skilled putting into operation of all this equipment, its competent assimilation, and carrying out preventive and scheduled repairs and other operations, taking climatic and geographic conditions into consideration, takes on special importance.

Otherwise the equipment breaks down prematurely, production efficiency is reduced and recovery levels decrease. Unfortunately, this has increased in frequency lately. The reason for this is a shortage of specialists to service equipment and mechanisms.

There is no plan to train engineers for a profession in "Machines and Assemblies of the Oil and Gas Industry" at the TPI. Nor are other VUZ's of the republic graduating them. As a rule, we hire mechanical engineers from the graduates of the Moscow Oil, Chemistry and Gas Industry Institute imeni

M. M. Gubkin, the Azerbaijan Oil and Chemistry Institute imeni A. Avizbekov and the Ivano-Frankovskiy Petroleum Institute.

Unfortunately, as practice has shown, the young specialists, in the best of cases, depart for home after the prescribed time. At worst, they, under various pretexts, do not even show up at their assigned locations.

In a word, the problem of major gas- and oil-extracting, and petrochemical enterprises and petroleum machine construction plants supplying mechanical engineers is still unresolved today, a situation which has a destructive effect on production.

By way of illustration, as A. K. Firsov, chief engineer of the Ashkhabad Petroleum Machine-Building plant informed us, in the shops of this enterprise, workers of other professions work as mechanics. And even Ashneftemash [Ashkhabad Petroleum Machine-Construction Plant] is being modernized. Its capacity will increase approximately two-fold. As a consequence, demand is increasing in the engineering force. And a similar situation exists in other enterprises.

However, as has already been said, there is no plan, as before, to train engineering personnel in the mechanical disciplines. Meanwhile, the Turkmen Polytechnical Institute's Petroleum Department seems to be capable of realizing the assignment. A collective of highly-qualified instructors and scientists works here.

The problem of opening a new department in the TPI requires a rapid solution. The higher school and the national economy of the republic await substantive word from Gosplan TSSR, which has precise information on the future demands for specialists in the above-named skills up to 1990.

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ESTABLISHMENT OF LABOR SAFETY ASSOCIATION SUGGESTED

Baku VYSHKA in Russian 10 Aug 84 p 2

[Article by Yu. Ismaylov, head of the Kaspbureneftegazprom [Caspian Drilling and Oil and Gas Industry] Industrial Hygiene and Safety Department, "The Matter Is Urgent"]

[Excerpt] Baku--Offshore drilling is conducted under specific conditions, differing from footage drilled ashore. Special demands are also made regarding the observation of safety rules. Much work has been done in our association's enterprises to prevent production accidents and improve working conditions.

Our primary emphasis is on providing drill sites with modern safety equipment. Thus, in 1983, 811 thousand rubles were spent on these measures rather than 457.6 thousand, i.e., almost twice what was planned. Twenty sets of automatic drilling tongs, 17 pneumatic power slips, 27 cantilever revolving cranes, 23 electric telphers and a lot of other equipment has been acquired and installed on production facilities. Just as much attention is being given in the associations to the mechanization and automation of such labor-intensive processes as the charging and treatment of drilling mud etc. Last year, 544 thousand rubles were spent on this, against the planned amount of 312.6 thousand. The implementation of measures to lower the noise level, improve lighting on the facilities and provide normal working temperatures are characterized by excellent indicators. This year we have set before ourselves the major tasks of providing offshore drilling personnel with healthy and safe working conditions. In 1984, an integrated plan was worked out for which 590 thousand rubles was allocated. This amounts to one-third more than in 1983.

Strict control over their observation is helping us to maintain a steady reduction in the number of safety rule violations. Thus, in 1983, for laxity in industrial hygiene work, disciplinary fines were levied on 180 association employees. Proceedings were instituted against 19 of them and 83 of them were deprived of bonus pay increases.

Unfortunately, we still have quite a few hindrances.

One of the main hindrances is a shortage of qualified industrial hygiene specialists. Indeed, it is no secret that not a single VUZ in the country is training engineers for this challenging skill. And occasionally you have people occupying this responsible position who have insufficient knowledge of the field. Another problem is that administrators of drilling enterprises, while focusing primarily on fulfilling drilling footage quotas, occasionally spend little time thinking about the responsible organization of the industrial hygiene department.

Tens of enterprises are members of the Kaspburneftegazprom Association, but offices of labor safety practices have been organized only in the Sangachaly MUBR [Offshore Administration of Drilling Operations], the Maritime MURB [Offshore Exploratory Drilling Administration] and the First Technological Transport Administration. But in fact, in accordance with an association order, these offices are to be set up in each enterprise.

Of course, it would have been possible to get partially out of the situation, had we had a mobile labor safety practices office, such as exist in many other areas of the country. This one-of-a-kind laboratory on wheels, equipped with film projection equipment, tape recorders and other equipment would be a great help to us in the wide propagation of advanced methods and techniques of labor safety. This question, which we put before the management of the Kaspmorneftegazprom VPO [All-Union Production Association] is still unresolved.

We still have trouble in that many needed scientific and research developments in the field of industrial hygiene are not being assimilated in production. Among these [illegible], for example, is the intercom unit, devised many years ago in the VNIItekhniki bezopasnosti [All-Union Scientific and Research Institute of Labor Safety Practices], which should be installed at the drillers station. Use of these units would be very helpful in reducing the number of industrial accidents.

About a year ago an article on this subject was published in [illegible] VYSHKA by VNIITB [All-Union Scientific and Research Institute for Labor Safety Practices] specialists. The article's authors wrote that it was unprofitable to many plants and manufacturers to begin production of new labor safety devices or appliances for the reason that they, as a rule, they require that new machining attachments be devised, they have a low specific quantity of metal per unit, and low production cost etc. In addition, these specialists think that there is a way out of the situation. The whole circle, from research and development to the production of new safety equipment, must be closed. In other words, a new scientific and production association must be set up. In our view, this would be the correct solution to the problem. But so far, as far as we know, there has been no progress in this matter.

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OIL AND GAS

ORENBURG PREPARES FOR KARACHAGANAK GAS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Aug 84 p 1

[Article by I. Payvin, personal SOTSIALISTICHESKAYA INDUSTRIYA correspondent, "A Gas Workers' Shift Team"]

[Excerpt] Orenburg--For eight years running, the Orenburggazprom [Orenburg Gas Industry] All-Union Industrial Association has held the CPSU Central Committee, USSR Council of Ministers, VTsSPS [All-Union Central Labor Union Council] and the VLKSM [All-Union Komsomol] Central Committee Red Challenge Banner. Ten years have passed since this gas-condensate field came into operation, and during this time 400 billion cubic meters of gas have been recovered. For 38 quarters the association has been awarded first place in the industry, only once dropping to second place. Now they have again taken on exacting obligations to recover 900 million cubic meters of above-plan gas.

At the field, in addition to the plant, the collective has custody of 64 wells, a fairly large operation. Right now there are 43 people at this field, where there used to be twice as many. Cutbacks in maintenance personnel have helped raise people's skill levels, assimilate related skills and introduce the brigade form of labor organization.

At the entrance to the plant grounds grow sturdy apple trees, filled with sun-ripened fruit. A little farther on, beyond a fence, there is a half-hectare of garden. I mention this to point out that before, when the idea for these fields was conceived, the opinion was expressed that not only would trees not grow, but neither would grass. However, reliable sealing of the equipment prevents air pollution, and now this place is ablaze with the whiteness of apple blossoms in the spring, and by autumn the fruit ripen. Cleanliness is being kept up at the other fields too, and they also have greenery planted.

"Of the 11 installations in the gas-refining complex," says N. Galyan, Orenburggazdobycha [Orenburg Gas Recovery] Association director, "today it would be difficult to single out the best. It would be more correct to say of all of them straight off, that the association has recovered 689 million cubic meters of gas above the plan in the last six months. Obligations have also been exceeded for growth in labor productivity. Instead of 2.1 percent, 2.5 percent was achieved. Production cost of commodity production has been lowered

1.9 percent.

Repair, supply and transport services have been centralized using the VAZ [Volga Automobile Plant] method. The brigade form of labor organization has been introduced in many sectors. All this has produced a considerable savings in equipment, the maintenance personnel force has been reduced and quite a few field personnel have cross-trained into new industries.

It is acceptable to call the Orenburg gas complex "giant". And so it is. Today, five associations and nine other major subdivisions are members of the Orenburggazprom Association. They are involved in drilling, recovery, shipment of output and repair. One of them, Orenburggazzavody [Orenburg Gas Refineries], is the center of the entire complex and symbolizes in itself the vigor of the industry and the achievements of engineering thought. How are things there?

The chief concern at the gas refinery is to bring the raw materials into the necessary condition and extract their valuable components.

These days the enterprise is carrying out a sound program of equipment rebuilding. As it turns out, the complex is preparing to take on gas and condensate from Karachaganak. This is a new, unique field, which has been discovered in the neighboring Ural Oblast, and where they are now developing the mineral resources. Six drilling brigades have left the association to go there. Drilling is a challenge there, with well depths of 5,500 meters. Gas from this underground storehouse should be flowing into the pipeline for refining in Orenburg by October of this year.

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BRIEFS

OILWORKER'S HISTORY, WORK RECOUNTED--After the army, having graduated from the Chernogorsk Technical School, Young Communist Leaguer Vyacheslav Katanov began working as a driller in a Talnakh geological and exploratory party. After a short time he mastered the new equipment and deep-well drilling technology. At present his shift is drilling in the Talnakh polymetallic ore field, serv- as an example of skillful, selfless labor. Katanov's shift was one of the first engaged in the mineral prospectors' competition for a worthy greeting to the 40th anniversary of the Victory. [Text][Moscow SOTSIALISTICHESKAYA IND-USTRIYA in Russian 16 Aug 84 p 1] 12659

FIRST ADYGEYSKAYA WELL OPERATING--Maykop--The first well drilled in the recent-ly explored Western Voznesenskoye gas field has begun production. It produces 20 thousand cubic meters of gas and 50 tons of gas condensate daily. Both types of fuel are characterized by high quality. For example, the condensate is to be used in the manufacture of highest-quality gasolines. Mineral explo-ration of the Adygeyskaya Autonomous Oblast goes on. It is showing promise here for the occurrence of oil and gas.[By Yu. Semenenko] [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 14 Aug 84 p 1] 12659

ASSOCIATIONS' RECOVERY LEVELS CITED--Almetyevsk--Tatneft' Association workers have recovered 300 thousand tons of above-plan oil since the beginning of the year. All the oil- and gas-extracting administrations have put their contri-butions in for a collective success, but the largest share of the additional recovery is due to the Al'met'evneft', Aktyubaneft', Dzhalil'neft' and Prikam-neft' collectives. [By U. Bogdalov, SOTSIALISTICHESKAYA INDUSTRIYA personal correspondent] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Sep 84 p 1] 12659

BOILER FURNACES OIL-FUELED--Cherdyn, Perm Oblast (TASS)--The well, which has a total daily output of 7 tons and was put into operation near the small Ural city of Cherdyn, turned out to be efficient. The oil is replacing coal, which had to be shipped long distances, in boiler furnaces. In the Kama region, all low-yield wells have been registered. Recovery from these wells will increase 6-fold by 1990. [Text] [Baku VYSHKA in Russian 4 Sep 84 p 1] 12659

ASTRAKHAN DEVELOPMENT WELL OPERATIVE--A commercial inflow of gas and conden-sate has been obtained from the first development well in the Astrakhan gas-condensate field. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 84 p 3] 12659

COMPRESSOR STATION STARTUP ANNOUNCED--Nizhnevartovsk, Tyumen Oblast--Start-up and adjustment work began on the Samotlor oil field's KS-3 gaslift compressor. Putting this station into operation will increase the influx of oil from almost 500 wells, and more effectively utilize the associated gas. [Text] [Baku VYSHKA in Russian 18 Aug 84 p 1] 12659

SANGACHALA DRILLERS BEAT DEADLINE--Baku--The drilling crew from the Sangachala MUBR [Offshore Administration of Drilling Operations], headed by drilling foremen Aliovsad Ragimov and Tel'man Suleyman, have completed about 20 thousand meters of footage from their steel platform in the Duvannyy-more field, all during the present five-year plan. Having fulfilled the fourth-year plan for footage drilled ahead of schedule, the brigade has already drilled more than 200 meters beyond the Caspian sea floor bottom, to be entered on the 1985 accounting. Completion well No 453 daily pumps out tens of tons of oil into NGDU [Oil and Gas Extraction Administration] imeni USSR 50-th Anniversary storage tanks from a depth of 5,140 meters. Meanwhile, the drillers have started drilling a new well--No 461, with a projected depth of 4,000 meters. Though less than three months have passed since they began drilling this well, the drilling bit has already sunk 2,200 meters into the earth, and the well encased by a string of steel tubing. [N. Mushailov, VYSHKA general correspondent] [Excerpt] [Baku VYSHKA in Russian 18 Aug 84 p 1] 12659

MAINTENANCE BRIGADE EFFORTS CITED--Baku--They say about S. Shukyurov's NGDU [Oil and Gas Extraction Administration] Ordzhonikidzeneft' maintenance brigade, that each of their minutes is worth its weight in "black gold". The collective has overhauled 135 wells since the beginning of the year, completing their assignment for ten months ahead of schedule. Over 90 percent of the wells have been turned over to the field personnel ahead of schedule. The tone at work is set by the shift team operators, Deputies of the AzSSR Supreme Soviet Vidadi Guliev and Imamkhan Kyazimov. [By N. Nadzhafov] [Text] [Moscow SOTSIALISTICHISKAYA INDUSTRIYA in Russian 24 Aug 84 p 1] 12659

NORTHERN BALKUN REFINERY OPERABLE--Ashkhabad--A comprehensive gas refinery has been put into operation at the Severnyy Balkun field in Eastern Turkmenistan. From here, 3 billion cubic meters of gas will be put into the Central Asia-Center gas main per year. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 15 Aug 84 p 1] 12659

NEW TUBING FOR TYUMEN--Tubing with new threaded connections, manufactured by the Tagangorsk Metallurgical Plant, is destined for the Tyumen oil fields. At the request of the Glavtyumenneftegaz Var'yegan Drilling Operations Administration oil workers, the important order was filled a half-year ahead of the deadline. The Taganrog workers have had a collaboration agreement with the oil workers for seven years. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 32, Aug 84 p 3] 12659

TARSDALLYAR FIELD BEGINS OPERATION--A new oil field has been put on the Azerbaijan geological map. A well, drilled in the Tarsdallyar area of the Kurin Steppe has produced oil. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 33, Aug 84 p 3] 12659

USINSK RECOVERS MILLIONTH TON--USINSK, Komi ASSR--An Usinskneft' Administration collective has recovered the millionth ton of oil since the field was put into operation. As much of the valuable raw material has been recovered here plus some, than has been recovered during the last 10 years. The mineral is developed here as it is in the industries: a gas refinery is in operation to treat the petroleum associated gas. Usinsk has become the base for developing new fields in the Arctic. There is an industry organized and in operation here for the recovery of heavy, high-viscosity oil by thermal methods. Following the example of the Usinsk oil workers, all the Komineft' Association subdivisions are recovering fuel ahead of established deadlines. Since the beginning of the year, more than 4 thousand tons of valuable raw materials have been sent over the plan to the center of the country. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 7 Aug 84 p 1] 12659

ABOVE-PLAN RECOVERY IN UDMURTIYA--Igra Settlement, Udmurtskaya ASSR--More than 10 thousand tons of above-plan oil have been recovered by the Igra Oil- and Gas-Extraction Administration collective in Udmurtia. This young branch of the autonomous republic's industry is developing with increasing rapidity in the face of difficulties for the oil workers: the geological structure is challenging and the deposits are scattered widely. The combined competition of drilling rig erectors, drilling personnel and development and well-repair operators was a great help. The motto of these brigades, working on the principal of thoroughness, was "We build ahead of schedule, and we make the field operable ahead of schedule". The production workers are successfully coping with the next plan for this year. They have decided to fulfill increased socialist obligations in September, by Oil-Worker's Day. [By A. Sabirov, personal IZVESTIYA correspondent] [Text] [Moscow IZVESTIYA in Russian 29 Jul 84 p 1] 12659

ARLANNEFT' KNOW-HOW PAYS OFF--Ufa--Production workers of the Arlanneft' Adminwork smoothly: since the beginning of the five-year plan they have recovered over 200 thousand tons of fuel over their quota. What brought about this success? The drillers who, since the beginning of the five-year plan, have turned over 38 wells above the plan, stood out. But the most important factor was the production workers who skillfully utilized the producing well stock and repaired equipment promptly. According to the proportion of labor expenditures, the operational coefficient and the inter-service period for operating capacities, the Arlan workers achieved the best indicators in the Bashneft' Association. In addition, they carry out over a thousand geological and technical measures here which make possible the additional recovery of up to a million tons of oil. [By I. Payvin, SOTSIALISTICHESKAYA INDUSTRIYA personal correspondent] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Aug 84 p 1] 12659

YUZHKUZBASSUGOL' MINERS EXCEEDING QUOTAS--Novokuznetsk--Eminent Kuznetsk Basin mining engineer and Hero of Socialist Labor V. Bardyshev's brigade is working smoothly and steadily this year from the Yuzhkuzbassugol' [Southern Kuznetsk Basin Coal] Association's Novokuznetskaya mine. The brigade's above-plan count since the beginning of the year has exceeded 40 thousand tons and is still growing: 2,500-2,700 tons of coal, of which several hundreds of tons are in addition to the program. Bardyshev's brigade has decided to fulfill the five-year plan by the anniversary of the birth of the Stakhanovite Move-

ment. They will recover 2,864 thousand tons of coal, 165 thousand tons above the plan, by this famous date. This means that labor productivity will increase by 9.7 percent relative to the plan, and because of lowered coal production costs 75 thousand rubles will be obtained. In July this leading collective will be working in a new longwall. During this month the miners have decided to recover 70 thousand tons of fuel. And for now, they are outstripping their own accelerated schedule. [By N. Poluyanov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 27 Jul 84 p 1] 12659

TRANSPORTABLE DAMS SAVE TIME--Shevchanko--Improving the technology used in developing oil-producing regions is helping the production workers of the Caspian Buzachi Peninsula to constantly increase recovery levels of valuable mineral resources. The one-hundred-thousandth ton of above-plan oil since the beginning of the year, has been recovered. Not every well which is sunk in an explored area will produce a commercial flow of oil--such are the special features of the occurence of the peninsula's formations. This is why it would be inadvisable to lay a permanent pipeline, each kilometer of which costs thousands of rubles, to a facility in advance of its construction. It used to be this way: a well is steadily producing oil, but there's no way to transport it; you have to wait until the construction workers get the pipeline laid to the well. Innovators helped to solve this problem. They helped devise transportable oil-collecting systems, i.e., coffer dams. Now, only a few hours in all are required to connect a new well to a permanent, operating oilfield pipeline. The time saved preparing wells for operation has allowed production workers to recover almost one-third of the above-plan oil. [Text] [Baku VYSHKA in Russian 15 Aug 84 p 1] 12659

KALAMADDIN FIELD RECOVERY PROGRESSING--Ali-Bayramly--An oil flow has started up from the fourth horizon of the pay zone in the Kalamaddin field. Ali-Bayramly UBR [Drilling Operations Administration] foreman Guseynaga Akhundov's drilling crew, of all the crews working, put new development well No 86 into operation ahead of schedule. The well produces 40 tons of pipeline oil per day. There are still three wells in some degree of completion in the field. However the brigade of oil- and gas-recovery workers, led by Sadagyat Azizov, Shirvanneft' NGDU [Oil and Gas Extraction Administration] foreman, works especially thoroughly with their stock of operating wells and tries to observe a precise operating schedule with them. Together with maintenance personnel, they carry out effective geological and technical measures, and obligations for a daily above-plan increase in oil recovery are met. Additional reperforations in wells No 3 and No 65 have produced a generous oil flow. Additional recovery amounting to 10tons per day was also obtained after identical measures were performed on well No 70. [By S. Garayev] [Text] [Baku VYSHKA in Russian 7 Sep 84 p 1] 12659

CASPIAN SLANT-HOLE WELLS PRODUCING--Yesterday, from well No 106, drilled from the first Caspian stationary platform, set up at a depth of over 100 meters, a flow of oil started up. The well produces 460 tons of oil per day. The drilling crew of foremen M. Aliyev and G. Isayev, of the Bukhta Il'icha MURB [Offshore Exploratory Drilling Administration] have successfully completed a well by construction after 4 months, instead of the planned 6. And the commercial speed of penetration was raised to record levels by the brigade--828

per drilling rig in a month. Let us emphasize, that this well was the eighth in succession, and was drilled from a special-purpose deep-water platform in less than two years. A few days earlier, well No 107 went into operation with a daily yield of about 400 tons of oil. Both were slant-hole wells, and MURB drill-crew members, engineers and geologists had to exert great effort to insure that the new holes were drilled precisely between operating wells. The leading drill crews have dedicated their success to the upcoming professional holiday: Oil and Gas Industry Workers' Day. Right now on the steel island preparations are going on to begin drilling of two more wells, vertical wells No 104 and No 108, which will have a projected deviation of 700 meters. The drill crews are set on getting these wells into production ahead of schedule also. [By O. Nechipurenko] [Excerpts] [Baku VYSHKA in Russian 22 Aug 84 p 1] 12659

COMPUTER AIDS PETROLEUM RESEARCH--Petroleum deposits located thousands of kilometers from the capital of Latvia are investigated "in absentia" in the Riga Polytechnical Institute imeni A. Ya. Pel'she. Additional information about the shape of petroleum formations, the spread of their temperatures and the properties of the surrounding soil is obtained with the help of mathematical experiments conducted in an electrical analog laboratory. The data, handed over to geologists, allows a reduction in the volume of exploratory wells drilled, and a recommendation for the most effective methods of developing new fields. Each experiment in simulating oil deposits has required complicated calculations. If general-purpose computers were used, these calculations would take at least 2-3 months. This way, results are arrived at after only a few hours. The multiprocess system, designed by VUZ scientists, makes such potentiality possible. In this system, a multipurpose digital EVM [computer] is combined with an analog computer. The first analyzes the set problem and selects alternative solutions, and the second enters its corrections. Both parts of the combination uninterruptedly exchange information. Communication between them is completely automated. This electronic hybrid is characterized by its extraordinary speed and the precision of its computations. This more improved system is built on integrated circuits. Specialists believe that it can be used widely in various branches of modern science and technology. [Text] [Tallinn SOVETSKAYA ESTONIYA in Russian 20 Jul 84 p 2] 12659

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L'VOV-VOLYN COAL BASIN RESERVES INCREASED

Kiev GEOLOGICHESKIY ZHURNAL in Russian No 4, 1984 (signed to press 4 Jul 84) pp 29-33

[Article by M. A. Samarin, A. I. Galaka and V. I. Popovichenko; "New Data on the Commercial Coal Content of the Coal Fields of the L'vov-Volyn Basin"]

[Text] The L'vov-Volyn Basin is located on the southwestern slope of the Volyno-Podol'skaya Uplands, in the upper reaches of the Zapadnyy Bug River, within Volyn and Lvov oblasts in the USSR. Structurally, the basin is located on the southwestern edge of the West European Platform. It correlates with the Lvov Paleozoic Depression, which is complicated by brachyanticline folds striking northwest. These folds alternate with gently sloping synclinal structures which are linked with coal deposits. The extent of the basin is about 10,000 square km.

Upper Proterozoic (Riphean and Vendian), Paleozoic (Cambrian, Ordovician, Silurian, Devonian and Carboniferous), Mezozoic (Jurassic and Cretaceous) and Cenozoic (Neogene and Quarternary) deposits comprise the basin's structure. The coal formations are of commercial significance. The total thickness of the sediment mantle ranges from 2.5-3 km at the margin to 6-6.5 km in the center of the basin.

The Lvov-Volyn Coal Basin is important to the national economy due to its advantageous economic and geographic position, and also due to its excellent coal quality. On 1 January 1982, there were 21 operating mines in the basin with a total production capacity of 16.73 million tons per year. This included 11 coking coal mines with total capacity of 6.55 million tons per year.

The basin's coals are used as a premium power-generating fuel mainly in the UkSSR, the RSFSR, the BSSR and the Baltic Republics. A significant portion of these coals is used in the western oblasts of the UkSSR (at the Burshtynskaya and Dobrotvorskaya GRES's , as well as other generating stations). Construction of the 10.6-million-tons-per-year Central Enrichment has been completed.

However, the growth of coal production in the basin, and possibly even the maintenance of present production, is hindered by the fact that the operating mines have reserves mainly in the range of 1 to 20 years (5 mines have reserves of up to 4 years, 4 have reserves of from 5 to 9 years, 8 have reserves of from

10 to 19 years, while only 4 have reserves of over 20 years). There are two reserve sections where new mines can be built: the Paromovskiy No 1 in the Volyn Field and the Chernovgradskiy No 3 in the Zabugskoye Field. These sections have a total production capacity of 3 million tons per year (0.9 and 2.1 million tons, respectively). The total $A+B+C_1$ reserves of these two sections are 146.5 million tons (41.2 and 105.3 million tons, respectively).

The fields of the Lower-Carboniferous Visean and Namurian stages and of the Middle-Carboniferous Bashkirian Stage are of commercial significance.

In accordance with the MSK [expansion unknown] Plenum's decision (November, 1974) to make changes in the Carboniferous stratigraphic scale used in the USSR, the Serpukhovian Stage was made a separate part of the Carboniferous. This stage in the L'vov-Volyn Basin contains the Poritsskaya and Ivanicheskaya formations, which were previously a part of the Upper Visean Stage. The Serpukhovian Stage also contains the Lishnyanskaya and Buzhanskaya formations, which were previously a part of the Namurian Stage.

Since production organizations have continued to use the old designations for the Carboniferous in the L'vov-Volyn Basin to index coal seams and limestone marker levels, and since researchers disagree about the volume of the Serpukhovian Stage and the location of its boundaries, this article uses the old (pre-1974) geologic structure designations.

The commercial coal content of the basin is correlated with the best-studied fields of the Namurian and Bashkirian stages (by the new designations, the Serpukhovian and Bashkirian stages). These stages extend over 1,000 square km. The basin's basic industrial seams are the n_7, n_7^1, n_7^v, n_8^v and n_9.

According to the pre-1960 requirements (minimum workable seam thickness, 0.6 meters, and A^c up to 40 percent), the proven reserves in the basin were about 1.5 billion tons. After new requirements were introduced (minimum seam thickness, 0.7 meters, and A^c up to 30 percent), these reserves were reduced to almost half of the previous reserves. Thus, as of 1 January 1979, the basin's $A+B+C_1$ reserves totaled 761.8 million tons, including 415.9 million tons (60 percent of all reserves) for operating enterprises and enterprises under construction, 41.2 million tons (6.1 percent) for reserve sections, 131.5 million tons (19 percent) for exploration areas, 98.5 million tons (14.3 percent) for promising sections and 3.3 million tons (0.5 percent) for other sections.

The basin is divided into the Volynskiy Coal Region (the Volynskoye Field), the Chernovgradskiy Coal Region (the Mezhrechenskoye, Zabugskoye and Sokal'skoye fields) and the Yugo-Zapadnyy Coal Region (the Tyaglovskoye Field and the Lyubel'skaya Exploration Area, which contains the Karovskaya Structure) (see Fig 1). The first three of the above fields are being put into commercial production. The basin's coals are long-flame, gassy and medium-volatile.

In order to study the Visean fields of the L'vov-Volyn Basin and to single out promising new areas for coal exploration, PGO [possibly Department for the Prediction of Geological Reserves] Sevukrgeologiya

(the former Kiyevgeologiya Trust) of the UkSSR Ministry of Geology made a map predicting the coal content of the basin's Visean fields.* After processing and analyzing the geological and geophysical data, they determined that the central and southwestern parts of the basin were the most promising areas to find new commercial coal seams of the Visean and Namurian stages. Coal exploration work was begun in 1970 by the L'vov Expedition of PGO Sevukrgeologiya, taking into account these recommendations, in these areas of the basin. This work was completed in 1981. This exploratory work confirmed the authors' conclusions on the extent of commercial coal fields of the Visean, Namurian and Bashkirian stages to the south and southwest of previously discovered fields.

The Visean deposits extend over about 10,000 square km and are more extensive than the deposits of other Carboniferous stages. However, their coal content was studied in detail only in the eastern part of the basin before 1970. In that area, they occur at depths of 220-350 meters. The Bubnovskoye and Busskoye fields in this region were explored. These fields contained one low-grade coal seam 0.5 to 0.55 meters thick. In the central and southwest parts of the basin, the Visean deposits are at depths of over 400 meters, and before 1970 had practically not been studied at all.

As was noted above, exploratory work was done in this part of the basin, beginning in 1970, by PGO Sevukrgeologiya (on areas adjacent to explored fields) and by Ukruglegeologiya Production Association of the UkSSR Ministry of the Coal Industry (on the fields of operating mines and mines under construction). In all, over 300 exploratory holes were drilled (about 30,000 total meters) in the L'vov-Volyn Basin. The holes were located along lines perpendicular to the strike of the coal deposits. The distance between the lines was 2-4 km; the wells were 2 km apart. In certain cases, they were somewhat more closely spaced.

The exploration work showed that the Visean deposits lie transgressively on the eroded surface of the Tournesian Stage or the Upper Devonian and are overlain by conformable sdeiments of the Namurian Stage. They are mainly dark-gray argillites, aleurolites and sandstones interlayered with linestones. In the lower part of the sequence, the limestone content reaches 50 percent and more.

Thirty-three coal interlayers and seams occur in the over-700-meter-thick Visean Stage. Nine of these (v_0^3, v_0^4, v_2^3, v_4^2, v_4^3, v_5^3, v_5^4, v_5^6 and v_6) are of commercial thickness (0.6 meters or more). Seam v_6, which is at the base of the Visean, is of commercial interest. It lies 8-25 meters lower than the base of the N_1 Namurian limestone and is of commercial thickness in certain areas. Its commercial significance was established in the Mezhrechenskoye Field and in the Mezhrech'ye-Zapadnyy Section. The southwest part of the basin is also a promising area; a number of drill holes in that area have shown the seam to be of commercial significance.

*A. I. Galaka, M. A. Samarin, A. A. Sakharov and L. Ya Solovova, "New Data on the Coal Content of the Visean Fields of the L'vov-Volyn Basin," GEOL. ZHUR., vol 32, is 1, pp 118-120, 1972.

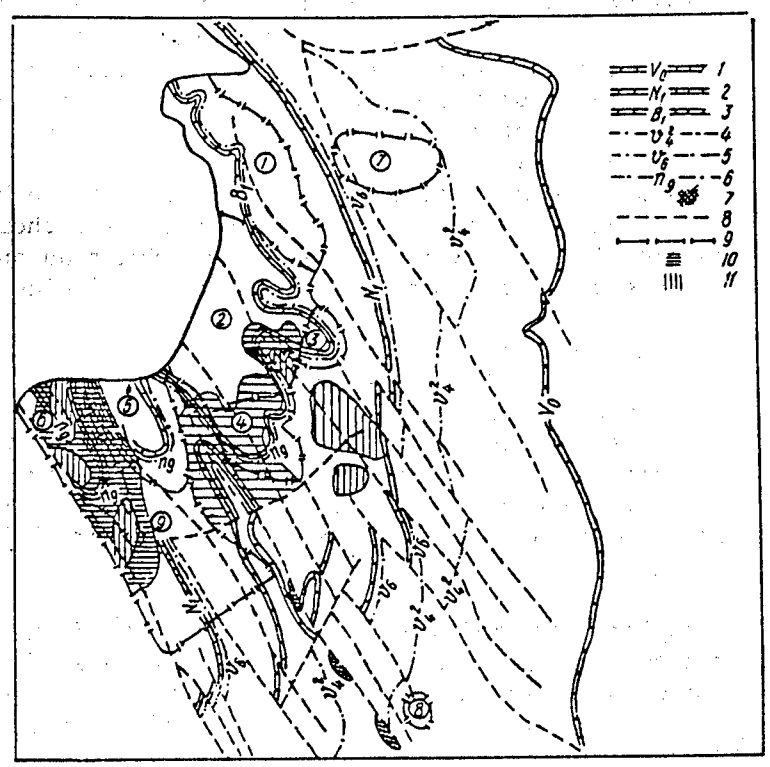

Figure 1. Schematic Map of the L'vov-Volyn Coal Basin

Limestone bed exposure on the Paleozoic surface:
1) V_0; 2) N_1; 3) B_1;

Coal seam exposure on the Paleozoic surface:
4) v_4^2; 5) v_6; 6) n_9;
7) Devonian exposures on the Paleozoic surface;
8) tectonic disturbance;
9) boundaries of coal fields and exploration areas;
10) area with predicted P_1 reserves;
11) same, with P_2;

Coal fields and exploration areas (circled numbers):

1) Volynskoye
2) Zabugskoye
3) Sokal'skoye
4) Mezhrechenskoye
5) Tyaglovskoye
6) Karovskoye
7) Bubnovskiy Section
8) Busskoye
9) Lyubel'skaya Exploration Area

The working thickness of the v_6 seam varies from 0,6 to 1,65 meters. Its depth varies from 315.7 meters in the northeast to 1380.8 meters in the southwest. It has a simple structure in the southwest part of the basin and a two-bench

structure in the Mezhrech'ye-Zapadnyy Section. The thickness of the rock parting between the two benches does not exceed 0,2 meters.

Table 1. Coal Quality of the v_6 Seam

Characteristic	Content		
	From	To	Average
Analytical moisture content, %	0.3	3.7	1.3
Ash content, %	4.6	30.4	13.9
Volatile content, %	20.3	46.1	34.7
Total sulfure, %	0.6	5.96	1.50
Heat of combustion, kcal/kg	8180	9159	8652
Density, g/cm^3	1.41	1.48	1.44
Thickness of plastic layer, mm	13-14	25	22
Carbon content, %	81.3	89.0	85
Hydrogen content, %	4.8	5.7	5.2

The Visean coal seams consist of clarain-durain coal. As the seam depth increases and the coal-bearing deposits become thicker, the intensity of metamorphism of these coals increases (as do the coals of the Namurian and Bashkirian stages) from the northeast to the southwest from grade G_6 to grade Zh and even to grade K (see Table 1).

Along with evaluating the coal content of the Visean deposits, the working coal content of the Bashkirian and Namurian deposits adjacent to explored fields was determined. In the southwest part of the basin, drill holes found eight workable coal seams: three in Bashkirian and five in Namurian deposits. In the central part of the basin (to the west, south and east of the Mezhrechenskoye Field), the n_0^6 seam was found to be of workable thickness (over 0.6 meters).

In 1978-1979, PGO Sevukrgeologiya recalculated the estimated reserves of promising areas, including the L'vov-Volyn Basin.** The recalculation took into account exploration data as of 1 July 1979. The calculated acceptable-grade estimated reserves, confirmed by the Inter-Organizational Expert Commission (July 1979, Moscow), for the L'vov-Volyn Basin totaled 473 million tons (Table 2).*** The exploratory work done during 1978-1981 in the Lyubel'skaya Area confirmed (and even significantly increased) these estimated reserves. Thus, as of 1 January 1982, the C_2 reserves of this area totaled 428 million tons. The exploration area (the v_6 seam) in the mining field of the Zabugskoye and Mezhrechenskoye fields, as well as an area partially adjoining the latter, were explored in 1979-1980. This area increased the balance reserves of G_6, G_{12} and

** According to a decision of the Permanent CEMA Commission on Geology (1976), estimated coal reserves in promising areas of all CEMA countries were recalculated.
*** Estimated reserves include coal seams over 0.6 m with A^c up to 40 percent. Category P_1 estimated reserves refer to coal reserves of explored areas, while category P_2 reserves refer to little-explored areas.

Zh grade coals by 77.5 million tons in category C_1, and by 50.3 million tons in category C_2. As a result, the L'vov-Volyn Basin coal reserves as of 1 January 1981 were increased in category A+B+C_1 to 806.1 million tons and in category C_2 by 50.3 million tons.

Table 2. Acceptable-Grade Estimated Reserves of the L'vov-Volyn Basin

Region, Area	Seams containing the estimated reserves	P_1	P_2	P_1+P_2
Chernovgradskiy Region				
Mezhrech'ye-Vostochnyy	v_6, n_0^6, v_0^4, v_4^3	--	43	43
Zabugskoye Field	v_6	11	--	11
Mezhrechenskoye Field	v_6	52	--	52
Yugo-Zapadnyy Coal Region				
Lyubel'skaya Exploration Area	v_6, n_7, n_7^1, n_7^v, n_8, n_8^v, n_9, $b_1(n_{10})$, b_3 (n_{12}), $b_4(b_1)$	265	18	283
Mezhrech'ye-Zapadnyy Section	v_6	84	--	84

In conclusion we note that this scientific and exploration work has for the first time established the commercial coal content of the Visean Stage deposits of the L'vov-Volyn Basin. They have expanded the boundaries of the coal content of the Namurian and Bashkirian stages and have located promising new areas. The significant estimated reserves of high-grade coals (G, Zh and some K) were confirmed by exploration. This has greatly improved the prospects for the growth of coal production in the L'vov-Volyn Basin.

12595
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NEW APPROACH TO UNDERGROUND MACHINERY REPAIR PROPOSED

Kiev RABOCHAYA GAZETA in Russian 8 Sep 84 p 2

[Text] The article "Achieved by Cooperation," published in our newspaper on 17 July 1984, told of an agreement between the entry drivers of the brigade headed by Hero of Socialist Labor N. G. Oleynikov from the Fourth Administration of Dneproshakhtostroy Combine and fitter-assemblers of the Rutchenkovskiy Mine Repair Plant, who are headed by N. N. Khoroshunov.

The essence of this new form of cooperation between two workers' collectives is that the mine developers have promised to double the normative service life of the 4PP-2 entry-driving machine after capital repairs. For their part, the repair workers have promised to make repairs without sending the machines up to the surface. This method of using and maintaining mining equipment greatly raises output and guarantees an accelerated pace of new mine development.

The Collegium of UkSSr Minugleprom [Ministry of the Coal Industry] approved this initiative. The ministry organized a meeting of specialists which was attended by a RABOCHAYA GAZETA correspondent. Organizational, structural and economic problems were discussed at the meeting, as were means for widely disseminating the experience of the innovators. We publish below the opinions of several meeting participants.

An Exchange Fund is Needed

[Article by I. Mitko, deputy chief of the Power-Mechanics Administration of UkSSR Minugleprom]

The problem of increasing the service life of coal-face equipment is one of the most critical problems in the sector. After all, all modern machines, either cutter loaders or entry-driving machines, are very complicated and expensive. The value of the initiative of the entry-drivers of N. G.

Oleynikov and the repair workers of N. N. Khoroshunov is that it opens a realistic path to improving mining machinery operating efficiency. The longer the machinery stays at the coal face without having to be sent up to the surface, the more coal will be mined and the more development work will be completed.

However, in order to organize equipment repair underground by repair experts, an irreducible exchange fund must first be created at mining-repair enterprises. In order to do this, reliable assemblies must be removed from irreparable mining machines as a first step. The assemblies must then be repaired, tested and completely readied for customer shipment. Then, as requests come from the mines, the parts are delivered to the coal face to replace the broken parts. But even with such a backup supply, additional spare parts, such as gear sets, bearings and etc., will be needed. And it is just these spare parts that the Yasinovatskiy Machine Building Plant, which builds the entry-driving machines, is clearly unable to supply in sufficient quantity.

Therefore, there's only one solution: the active participation of machine builders and mining machine designers in underground unit repair.

The Manufacturer's Responsibility

[Article by N. Podgorodetskiy, chief engineer of Donetskugleremont Production Association]

The businesslike cooperation between the entry drivers of Dneproshakhtostroy Combine and the fitter-assemblers of the Rutchenkovskiy Mining Repair Plant is interesting. However, considering the fact that the sector's normative demand for spare parts is only 60 percent fulfilled, it would hardly be possible to implement this initiative for all mining equipment in use.

Therefore, it would be more effective to organize equipment assembly repair underground for mine development workers, support the initiative and gain experience in order to transfer it to operating mines. At the same time, the mine development workers must operate the machinery properly and present it for maintenance on time, rather than running it until it falls apart. In particular, studies of 4PP-2 machines at that same Dneproshakhtostroy, at mines Nos 16-17 and 21-22, showed that some assemblies on these machines had been used until they were irreparable.

And there's more. Many plants of USSR Mintyazhmash [Ministry of Heavy Machine Building], such as NKMZ [Novokramatorskiy Machine Building Plant], Uralmash, Zhdanovtyazhmash and others, provide technical inspection of their machinery's performance during the guaranteed service life. If necessary, they fix any maladjustments or breakdowns themselves. The Yasinovatskiy Machine Building Plant of the same department, though, has a different practice: after they deliver a machine to a customer, they don't care about anything at all.

Cooperation between operating personnel and repair workers is important and profitable. However, mining equipment manufacturers must also be included. Great gains would be made by joining the links between the machine building plant, the repair plant and the mine.

Increase The Resource

[Article by A. Tarasov, chief mechanic of Ukrshakhtostroy Association]

The organizations of Dneproshakhtostroy Combine presently operate eleven 4PP-2 entry-driving machines. Five of them have completed their normative service period and are awaiting capital repair. How "hard" did these machines work? In Administration No 3, three entry-driving machines excavated from 71,000 to 91,000 tons of rock during their service period, compared to the norm of 63,000 tons. The 4PP-2 machine carrying serial No 377, operated by Administration No 4, excavated 120,947 tons of rock.

On the one hand, these facts testify to the reliability of the equipment produced by Yasinovatskiy Machine Building Plant. On the other hand, they show the care given to the equipment by the entry-driving collectives.

But, no matter how large a strength safety factor is designed into a machine and no matter how well a machine is maintained, there comes a time when a machine must be sent away for repairs.

This is always a sad moment for mine development workers. Experience has shown that it takes almost six months to disassemble the machine, complete the capital repairs and reassemble it in the mine. A solution is suggested by the initiative of the entry-driving brigade of Hero of Socialist Labor N. G. Oleynikov and the fitter-assembler brigade of N. N. Khoroshunov. These collectives conducted an experiment in the unit repair of a 4PP-2 machine right at the working face. It showed that not only time and a lot of money could be saved, but also the machine's service life could be extended.

The machine operated by the entry-driving brigade of P. D. Dyadechno, of Mine Development Administration No 3, Dneproshakhtostroy Combine, is now being repaired in the same manner.

However, as RABOCHAYA GAZETA noted, the growth of this initiative is being hindered by the lack of incentive on the part of the factory fitters who guarantee the continuous operation of the machine in the mine. In addition, underground repair is not even included in the factory's plan!

It would seem that these problems should be solved by the respective administrations of Minugleprom.

> Thus, in the opinion of the specialists, the initiative of the brigades of N. G. Oleynikov and N. N. Khoroshunov is opening the way to the increasingly effective use of both entry-driving and cutter-loader equipment. The initiative will also increase

equipment service life, save lots of time and reduce expenses.

However, the broad implementation of underground unit repair requires the efforts of not only operating and mine-repair personnel, but also of the manufacturers. It would seem that the Yasinovatskiy Machine Building Plant is long overdue in adopting the experience of NKMZ, Uralmash and Zhdanovtyazhmash in the area of technical maintenance of the equipment they produce. Obviously, Minugleprom's machine building plants must also respond to the idea of these innovators.

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LATEST DEVELOPMENTS IN PLOW TECHNOLOGY REVIEWED

Kiev RABOCHAYA GAZETA in Russian 24 Aug 84 p 1

[Article by M. Lobasov, director of the Voroshilovgrad Branch of ShakhtNIUI [Shakhtinsk Coal Scientific-Research and Project-Design Insititute] imeni Terpigorev, candidate of technical sciences: "The Plow Is The Miner's Friend"]

> [Text] An important event has occurred in the republic's coal industry, although the event remains somewhat obscure. After a long period of decline, coal production by plow devices and machines has begun to rise at a fairly fast rate.

Our collective has been involved in developing plow technology for over 30 years. The first-generation plows have seen much use in Donbass mines. These plows helped to set all-union and world coal production records: over a million tons of coal were mined from one face by the brigade of A. Tatsenko at the Imeni 50 Letiye Sovetskoy Ukrainy of Donbassantratsit Combine and by the brigade of M. Chikha from Rostov Oblast.

But time passes, and the number of thick seams in the Donbass decreases year after year. As a result, more thin and very thin seams have to be worked--seams that had been considered unworkable, with non-balance reserves. Narrow-width cutter-loaders have to "pass up" such seams. Plows are just about the only technology that can remove the coal.

For this purpose, our collective developed the UST-2M unit (manufactured by the Shakhtinskiy Machine Building Plant) for mining seams from 0.55 to 1.0 meter thick. This plow was put into series production in 1981 and received the State Mark of Quality. UST-2M machines are now operating at 63 coal faces in the Donbass. At Voroshilovgrad Oblast mines alone, second-generation plow systems and machines produced 15.4 million tons of high-grade coal in three years. Experience indicates that under similar mining and geological conditions, plows increase labor productivity by 25-50 percent and reduce production costs by 15 percent compared to cutter-loaders. Plows increase the yield of large- and medium-sized coal up to 70% and reduce the coal dust content in the fuel down to 25 percent. On faces worked by cutter-loaders, the coal dust content can reach almost half, which sharply reduces coal production efficiency. This involves not

hundreds or thousands, but millions of rubles of savings. Plows produce less dust than cutter-loaders, improving the working conditions and making mines safer. Therefore, a saying arose among miners: "The plow is the miner's friend."

The development and implementation of automated coal production systems is now on the agenda. These systems would not require the constant presence of personnel at the coal faces. Our collective has taken on this task in earnest. The miners correctly call the new KSA plow system "third generation technology" and "the machine of tomorrow." The branch's collective is now working on this system.

The design work is basically finished. Drawings for the prototype have been sent to the manufacturing plants. The first unit is to be provided to miners for testing in December of next year. The collective of the Imeni 23 S"yezd KPSS Mine (Roven'kiantratsit Production Association) is preparing at top speed for this important process. A new level is being opened up. Entries and coal faces are being excavated that will meet the requirements of the world's first automated coal mining system.

The implementation of the latest machinery in the coming years should help solve the task facing the scientists and production workers: raise plow coal production from 15 to 35 million tons per year.

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FLUIDIZED BED TECHNOLOGY IMPROVES DONETSK AIR QUALITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Sep 84 p 2

[Article by A. Didur, Donetsk: "The Sky Clears Up In Donetsk"]

[Text] The residents of mining capital Donetsk have recently begun to notice some delightful changes: the smokestacks of the boiler rooms which supply heat and hot water to homes and industrial enterprises now put out much less smoke. Who has taken the color out of the smoke plumes above the city?

The organization that has taken the initiative to modernize the boilers is the Teploenergoavtomatika Specialized Administration of Donetskugleavtomatika Trust, UkSSR Minugleprom [Ministry of the Coal Industry]. Its personnel have taken on the reconstruction of combustion chamber devices with great determination. They have shown in practice that smoke emissions can be reduced and low-grade coals can be burned more efficiently. This is done by burning the coal in a fluidized bed. This is what the administration's director, Vladimir Vasil'yevich Gavrilenko--one of the designers of the project and a tireless propagandist for it--says:

"The coal industry is an extractive sector. At the same time, it also uses an enormous amount of energy resources: no mine or mining settlement could get by without heat and hot water. Within the system of the republic ministry alone, over 8 million tons of fuel were consumed for these needs. At the same time, the series-produced industrial boilers equipped with grate-fired furnaces were designed to operate on high-grade coals. In practice, the quality of incoming fuel has recently declined because of higher ash, moisture and small fractions contents. It is not surprising that its utilization factor barely reaches 50 percent. And, even one percent on a republic-wide scale is equal to 80,000 tons of coal. Thus, the implementation of the new technology is producing direct savings that are expressed in millions of tons of fuel."

The first attempt to burn low-grade fuel in a fluidized bed was made after the rebuilding of the furnace at the Imeni 24 S"yezd KPSS Mine of Pavlogradugol' Production Association. The results showed that with certain design and technology changes, the same boilers could operate much more efficiently. The fuel layer is now much thicker than in other furnaces. High-pressure fans supply enough air through the layer so that

the coal seems to boil. Each fuel particle receives enough oxygen to ensure complete combustion. At the same time, measures are taken to prevent the slag from caking.

Lately, one can see the administration's engineers and installation personnel at many of the oblast's mines. There, with their sleeves literally rolled up, they are helping to adjust the new combustion technology. They still visit the Mospinskaya Mine in Donetsk most often: it has become a kind of laboratory for the innovators.

When the "advance party" of workers from the administration, including engineers A. Tkach and M. Konstantinov and fitters V. Storozhuk, N. Tkachenko and V. Chernov, arrived here several years ago, they found an old combustion chamber. The stokers had to manually shovel tens of tons of coal a day into it. Incidentally, this coal came from other regions, since the unit could not burn local coal. The newly arrived brigade decided to build a separate thermal reactor for burning the coal in a low-temperature fluidized bed. The boilers themselves were to serve as heat utilizers.

The results were better than had been predicted: the local coal, which had not been used for a long time, was burned at a rate of 79-82 percent. And now, two boilers, instead of four, provide sufficient heat.

The boiler room of the Mospinskaya Mine is more often being called a thermal shop. And not without reason: it actually reminds one of a shop in a modern enterprise, where automation takes the place of people. The health and sanitary conditions of the workplace have significantly improved. The stokers now wear coats instead of dusty overalls.

The fairly thick stream of smoke which had previously emanated from the smokestack has been reduced to a barely noticeable wisp. The exhaust now is cooled in a cooling chamber, where particulates are trapped, before going into the atmosphere. It all adds up to this--more heat and less dust and smoke.

The energy workers of the Donbass are already thinking about the next stage. The fly ash that is now being dumped is a wonderful material for producing cement and slag blocks.

The Donetsk masters of small-scale energy are now thinking about a closed cycle. The cycle would be like this: 1) fuel-preparation shop-sections for boiler rooms using high-ash-content coal; 2) rebuilt industrial and residential boilers and 3) utilization of waste products for economic and other needs.

More and more smokestacks in Donetsk Oblast are now cutting back their long black plumes. And, the sky above the mining region is becoming brighter.

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BRIEFS

NIZHNEVARTOVSKNEFTEGAZ OIL PRODUCTION LAGS--Of the eight oil-and-gas producing administrations in Nizhnevartovskneftegaz Association (whose general director is F. Marychev), only two are meeting their plan: Belozerneft' and Pokachevneft'. The others are quite a bit below plan. Var'yeganneft' and Ur'yevneft' are each more than 600,000 tons below their planned production. The association's total oil production shortfall is over 1.3 million tons. Well-site engineering services are not sufficiently effective. Secondary recovery methods are not being used widely enough. Help from Minnefteprom [Ministry of the Petroleum Industry] is not producing the expected results, although the ministry recently began to supply additional funds, equipment, personnel and transport to develop the region. The oil workers are especially critical of their suppliers. Minkhimmash [Ministry of Chemical and Petroleum Machine Building] equipment suppliers such as the Borets Association in Moscow and a number of machine building plants in Baku are delivering low-quality, incomplete equipment to the Siberians. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Sep 84 p 3] 12595

VAKHRUSHEVUGOL' PRODUCTION, PRODUCTIVITY UP--Karpinsk--The miners of Vakhrushevugol' Association have produced over 100,00 tons of coal above plan since the first of the year, allowing them to revise their annual obligations. The association had an above-plan increase in labor productivity of two percent--twice as much as was orginally targeted. Because of this, the volume of additional annual coal output will increase to 160,000 tons per year. Following the Stakhanovite tradition, the leading miners are generously sharing their experience. [Text] [By A. Mal'tsev] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Sep 84 p 1] 12595

MINE PRODUCTION EXCEEDS PLAN--Roven'ki, Voroshilovgrad Oblast--Although tired after their shift, the miners had smiles on their faces. The working comrades were greeted with music and flowers. A banner proclaiming "1,000,000 Tons Produced" was raised high. This is how much coal the miners of the Imeni Kosmonavty Mine (Roven'kiantratsit Production Association) have produced since the beginning of the year. One hundred and forty thousand tons of that million are above-plan. This level was reached a month ahead of schedule. The basis of this success was the untiring struggle of the coal-mining experts for an above-plan increase in labor productivity. Productivity was especially high in the brigade of

Hero of Socialist Labor G. Motsak. The brigade daily produces 1,700 tons or more of anthracite, compared to the plan of 1,300 tons. All other mining brigades are overfulfilling their tasks. [Text] [By V. Mikhaylichenko] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Sep 84 p 1] 12595

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NON-NUCLEAR POWER

KAMAZ POWER STATION CONSTRUCTION BEHIND SCHEDULE

Moscow STROITEL'NAYA GAZETA in Russian 4 Jul 84 p 1

[Text] The Kamaz plant's heat and power station (TETs) is by right referred to as its energy heart. However, the demand for heat increases with every year, and the time has come for expanding the station's capacity. That is why it was decided to begin construction of its second stage.

Of the projects slated for installation in the framework of the station's expansion several have been put onstream - four water-heating and one power boiler. Another - the 175 thousand kilowatt turbine No 10 - is to be commissioned in December of this year.

The experienced collective of the Metallurgstroy administration, Kamgesenergostroy construction trust, took up the assignment with enthusiasm. It undertook to complete the turbine job ahead of schedule, by Power Worker's Day. Construction and installation plans are being fulfilled every month.

Working here from the outset is R.Valeyev's brigade. This year it contracted to lay the foundation for the turbine and install the columns of the main building's second stage, and every month does 140 percent or more of its plan.

And yet the fulfilment of the gross production plan and the shock work of a few collectives brings little joy to client and builders alike. Because clearly discernible behind the overall figures is a lagging behind on specific projects.

"We provided our main subcontractor, the Kama administration of the Volgoenergomontazh construction trust, with a workfront worth over 900 thousand rubles," says chief engineer of the general contractor construction and installation administration No.42 A.Goremykin. "But there is a shortage of installation men. Together with auxiliary services there are now 150 of them, whereas the need is for twice that number."

Shortcomings in work organization were augmented by snags in supplies for the construction project. The steelwork plant of the

Kamgesenergostroy construction trust did not deliver the 260 tons of metal structures for the turbine servicing areas and the 100 tons of overhead beams for the main building which were all supposed to have been shipped in as far back as March. Neither have we received any accumulator tank, and that is another 96 tons. Without the overlapping of the de-aerator section you cannot install anything positioned above it.

Work on the outstation facilities has not begun because of the absence of large-diameter water circulation conduits. Their delivery by the North Caucasus steel structures plant of the Energostal'konstruktsiya construction trust is slated only for the third quarter.

All these construction organizations and enterprises belong to one master - the USSR Ministry of Power and Electrification, which commissioned the project in the first place. Why, then, are these schedule violations allowed to happen? According to the Central Statistical Administration of the USSR, Soyuzenergomontazh, to whom the construction trusts Volgoenergomontazh and Gidromontazh are subordinated, has more workers than allowed by plan. Yet this underway project is suffering from a manpower shortage. What is this - an inability to get things organized or just plain irresponsibility?

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NEW PUMPED STORAGE PLANT UNDER CONSTRUCTION IN ZAGORSK

Frunze SOVETSKAYA KIRGIZIYA in Russian 3 Aug 84 p2

[Article by APN correspondent A.Perevoshchikov: "Building the Zagorsk GAES"]

[Text] The first Soviet industrial pumped storage power station (GAES), which has a capacity of 1.2 million kilowatts, is being erected near the Moscow region town of Zagorsk. An experimental station of this type is already functioning in Kiev. The Zagorsk GAES will become a testing range for future GAES projects in the European part of the country.

The Energy Program of the USSR, which runs to the year 2000, assigns a special role to GAES's. The fact of the matter is that most of the increment in the production of electricity in the European part of the country is to be provided by atomic power stations (AES). The optimal operating mode of the latter is a uniform workload throughout the day. However, the consumption of electricity in this region over a 24-hour period tends to fluctuate. It is precisely the GAES that allows this unevenness to be leveled out in the most efficient way. During peak hours the GAES functions as an ordinary hydroelectric power station, the sole difference being that the water is not dumped into the river, but accumulated in a so-called lower reservoir. At night the GAES, taking in the redundant electricity generated by one or more AES, pumps the water from the lower reservoir into the upper in preparation for a new cycle. As established by experts, total GAES capacity in the European part of the Soviet Union must comprise about 20 percent of the overall capacity of the atomic power stations in this region.

What are the parameters of the Zagorsk GAES?

The volume of the lower reservoir is 33 million cubic meters, the upper - 30 million. The difference in their water levels is 100 meters. Installed in the station will be 6 turbines of 200 thousand kilowatts each. The length of the pipeline bringing water to the

turbines will be 740 meters, the diameter of its cross section - 7.5 meters. All the station's equipment will be Soviet made.

"The selection of this spot in the plains part of the RSFSR is no accident," says construction project chief Vladimir Plotnikov. "We were influenced by two factors - the natural elevation differential and the possibility to make maximum use of local building materials (not far from the construction site is a sand and gravel quarry). Moreover, there is a railroad and highway close by, to hook up the GAES to the Moscow grid you have to put up only 60 kilometers of power lines.

The pipeline is being assembled from large-diameter steel-concrete segments which we make on the spot by adding a concrete facing to the traditional steel ring, thereby enhancing the reliability of the whole structure. The laying of the segments is done by a powerful winch that can operate at substantial elevation differentials and under any angle.

The building material we use for the Zagorsk GAES project is a so-called broken-stone concrete. Under the customary method of preparing the concrete mix all small particles it may contain are removed. We, on the other hand, utilize the small fragments of broken stone as a dispersing filler. This lends the concrete the required durability and frost resistance, which is especially important for the Zagorsk GAES reservoirs because the amplitude of the daily fluctuations in the water level will be 9 meters. In the winter these 9 meters of concrete surfaces will, therefore, be periodically exposed to low temperatures. The use of broken-stone concrete not only improves the frost-resistant properties of the structure, but reduces the cost of the project by several million rubles as well.

We are using a novel construction technique for the Zagorsk GAES. The "classical" work sequence is to bed the soil in several 40-centimeter-thick layers every one of which is rammed to maximum density. At the Zagorsk project we are laying 6-7 meters of soil in one move and compacting it over its entire depth with a 15-ton mechanism. This makes for a threefold increase in the pace of construction, and we save millions of cubic meters of soil because only its organic layer is stripped off.

Briefly about the machinery being put in. We are installing mechanisms that operate in both the turbine and the pump modes. This new top-quality hydrogenerator is sufficiently profitable. Moreover, its use will free us from any dependence on the vicissitudes of the foreign market.

The investment recovery time for the station is tentatively set at five years."

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AZERBAIJAN TO GET HIGH VOLTAGE OVERHEAD POWER LINE

Baku VYSHKA in Russian 4 Jul 84 p 1

[Text] The Azerbaijan state regional electric power station (GRES) is continuously increasing its electricity output. Each year the station's capacity expands by 300 thousand kilowatts. To transmit that electricity to the various industries of the national economy and ensure greater reliability in their electric power supply a new high-voltage overhead power line had to be built. The leading consumer of electricity in the republic is the Baku Industrial Complex, and this is where the line is heading for. Starting in Mingechaur, it will cross the Shirvan valley along its northern edge, then run from west to east along the southern slopes of the Main Caucasian Range through the territories of Yevlakh, Vartashen, Kutkashen, Agdash, Ismailly, Geokchay, Akhsu, Kyurdamir, Shemakha and Apsheron rayons. It goes without saying that the industrial enterprises, kolkhozes ans sovkhozes located here will see a substantial improvement in their electricity supply.

Furthermore, the line will feed electricity to the United Transcaucasian System as well. All this highlights the importance of the new project for every sector of the national economy.

This is the first such high-voltage (500 kilovolts) power line to be erected in Azerbaijan. It vividly illustrates the growth of the republic's energy supplies and its increased contribution to the country's Energy Program.

The design project for the line was developed by the Azerbaijan affiliate of the "Energoset'proekt" institute, USSR Ministry of Power and Electrification (Minenergo). The general contractor is the "Kavkazelektroset'stroy" construction trust. The actual building of the line has been assigned to three of its mechanized columns - Nos 8, 23 and 54.

They began work in the second quarter. The transmission towers and pedestals are supplied by Minenergo enterprises. Over 100 of these have already arrived. 4.2 million rubles' worth of construction and installation work will be done before the year is out. In addition to the overhead power line a high-voltage distributor substation will be built on the Apsheron peninsula. The entire complex is due to be commissioned next year.

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POTENTIAL RESERVES OF SMALL RIVERS FOR ENERGY SUPPLY DISCUSSED

Moscow PRAVDA in Russian 7 Jul 84 p 2

[Article by Corresponding Member of the USSR Academy of Sciences D. Zhimerin, chairman of the Scientific Council of the State Committee for Science and Technology, Corresponding Member of the USSR Academy of Sciences N. Kovalev, chairman of the Central Administration of the Scientific and Technical Society of Power Engineering and of the Electrotechnical Industry, and Candidate of Technical Sciences L. Mikhaylov, chief of the Gidroproyekt Institute: "The Energy of Small Rivers"]

[Text] The search for additional energy resources, capable of replacing liquid fuel, has been under way during the past few years in all industrially developed countries. One of the directions is the feasibility of utilizing the potential energy reserves of small rivers on a new technical basis.

Let us stipulate immediately: "small" hydropower engineering cannot and should not replace "large" hydropower engineering in the combination that solves problems of power engineering, irrigation and transport. We are talking about the fact that the latest advances of scientific and technical progress permit a new look at its possibilities. The use of the energy of small rivers, of the drops of irrigation canals, of reservoirs of non-energy designation and also modernization of existing and renovation of small non-operating GES on the basis of new technology may become a significant contribution to the country's energy supply.

As is known, extensive construction of small GES with output of less than 5 megawatts was organized in the USSR during the postwar years. Special planning organizations and enterprises were created for this. Approxiamtely 7,000 small GES with total output of 1.5 megawatts were constructed over a period of 5 years. Beginning in the 1950s, the development of large-scale power engineering and construction of electric networks, which provided rural regions with electric power, made small GES non-competitive. As a result, less than 400 of them remained in operation. At the same time, it was established by a check that, although many small GES are not operating, their main structures are still preserved and can be used.

A similar process of mass construction and later shutdown of small GES occurred in many countries, specifically, in the United States, France and Japan.

The search for progressive engineering solutions, directed toward increasing the economic effectiveness of small-scale hydropower engineering, is now being organized with regard to the rigid course toward reducing the consumption of petroleum for power engineering.

The "Basic Directions for Economic and Social Development of the USSR for 1981-1985 and for the Period up to 1990" provided more complete utilization of the energy of small rivers. To implement this, the USSR State Committee for Science and Technology formed a temporary scientific and technical commission. Having analyzed the situation, the commission presented a report to the scientific council of the GKNT [State Committee for Science and Technology].

For example, the commission preliminarily determined non-energy reservoirs with an energy potential on the order of 300 million kilowatt-hours annually in the RSFSR and the economic effectiveness of constructing small GES in regions of decentralized energy supply, where expensive diesel electric power plants are used, was also determined. The largest number of them goes to isolated regions of the north and east of the USSR (Kamchatka, Chukotka and Yakutiya) and the high-mountain regions of Central Asia and the Caucasus. The expenditures for delivery of fuel are high there and the cost of generated electric power reaches a ruble per kilowatt-hour. The consumption of diesel fuel by the electric power plants of these regions may increase to 5 million tons in the future. Under these conditions, small hydropower engineering will help to reduce the consumption of liquid fuel.

Worldwide practice shows that the main methods of increasing the economy of small hydropower engineering are conversion to the use of standard designs and standardized components in construction and use of complete sets of serial equipment. The task consists in the manufacturer delivering a hydroengineering unit that is ready for installation without assembly at the construction site. The control of the small GES should be automated so that its operation does not require maintenance personnel. These measures alone will permit a reduction of capital expenditures by almost one-third. Small GES can be erected by mobile specialized columns without temporary auxiliary structures. This method will provide an appreciable reduction of expenditures and will reduce the course of construction.

According to the recommendations of the scientific council of GKNT, the Gidroproyekt Institute of USSR Minenergo [USSR Ministry of Power and Electrification] will compile a technical and economic report on the basic directions for development of small hydropower engineering in the USSR and will evaluate the work on renovation of non-operating small GES, modernization of them and the volume of substantiated new construction in different regions of the country. Preliminary data indicate that more than 200 installed units of different types for small GES can be replaced by one or two types of hydroturbines. This standardization will appreciably increase the efficiency of operating small GES provided that a simple and reliable hydroengineering unit is developed.

To accelerate the beginning of operations, the Gidroproyekt Institute is investigating existing facilities and is also selecting those facilities which

can be erected on reservoirs and canals under construction and those planned for construction. We are talking, for example, about the Kursk Reservoir on the Tuskar' River and the Vladimir Reservoir on the Desna River, about the Konstantinovka and Bagayev hydroengineering complexes on the Nizhniy Don, about the Stavropol and Nevinnomyssk Canals and also about similar facilities in Central Asia, Kazakhstan and in the Far East, where it is feasible to construct small GES on the basis of standardized designs.

Success in this important matter will depend on organization of construction, manufacture and delivery of complete sets of equipment. It is now worth Minenergomash [Ministry of Power Machine Building] to organize development of standardized hydroturbine equipment in the near future for small GES and serial production of it at its own plants. According to preliminary calculations, it is planned to manufacture 170 modular hydroengineering units during the next few years for small hydropower engineering and then to manufacture up to 5,000 modular hydroengineering units for small GES. Brigades have already been created in a number of ministries to examine operating and shutdown small GES and development of their pilot group is under way.

Unfortunately, Minelektrotekhprom [Ministry of the Electrical Equipment Industry] and the department of electrical equipment industry of USSR Gosplan have not yet determined the volume of production of hydrogenerators for small GES for the 12th Five-Year Plan. USSR Minenergo should accelerate examination of operating and shutdown and small GES, while USSR Minsel'khoz [Ministry of Agriculture] and the RSFSR Minrechflot [RSFSR Ministry of the River Fleet] should participate actively in this work. USSR Minenergo must also provide financing for the planned developments, without which construction of small GES cannot begin.

We feel that it is feasible to entrust construction to those organizations which develop dams, reservoirs and canals and entrust installation to the organizations which install hydroengineering and hydropower equipment there.

We note in conclusion that small GES, by slightly alterating natural conditions, create favorable prerequisites for more complete utilization of the energy potential of a number of reservoirs. They will thus have an effect on fulfillment of the Energy Program, will provide conservation of fuel resources and will improve the electric supply of consumers located in the zone of their operation.

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NON-NUCLEAR POWER

GAS LINE CONSTRUCTION TO LADYZHIN GRES

Kiev PRAVDA UKRAINY in Russian 18 Jul 82 p 2

[Article by N. Baras', PRAVDA UKRAINY correspondent, Vinnitsy Oblast: "Rebirth of the GRES"]

[Text] The 25-kilometer branch of the gas line has now approached the main building of the Ladyzhin GRES. It will soon join the major gas pipeline Soyuz with the first three units of the power plant. The construction and installation organizations of Mingazprom [USSR Ministry of the Gas Industry] and Minenergo SSSR [USSR Ministry of Power and Electrification] planned to complete the main volume of work 1 month ahead of the planned deadline. Natural gas will flow to the burners of the plant's boilers in August.

Since startup of the GRES, the Ladoga power engineers have perhaps not had a more significant event than transfer of the station to natural gas. This is explained by two circumstances: by the importance of it for the country's economy and by the advantage for the enterprise.

"The calculations of our economists showed," says the chief engineer of the GRES Ye. K. Yakushin, "that the specific consumption of conventional fuel will be reduced by almost 8 percent with use of gas. Conservation of coal and fuel oil will be discernible--approximately 300,000 tons annually. The cost of a kilowatt-hour of electric power will be 1/1.5 as much. The conversion to gas will also have a positive effect on the region's ecology. In short, a considerable effect is anticipated."

But complicated and very intensive work still remains. The project envisioned laying a gas line, construction of a gas distribution station and two gas-distribution points and reconstruction of all six units of the GRES. Matters were complicated by the fact that reconstruction and the framework of the plant boilers had to be carried out without shutdown of production.

The real respiration of the power plant is felt just here--in the boiler and turbine shop, among the piles of fittings, pipelines and instruments. The shop has recently been transformed appreciably. Renovation is under way.

We found the brigade leader of installers of the Yuzhteploenergomontazh Trust P. A. Mulyavka in the fourth unit. Matters were coming to completion: it

remained to strengthen the last burner and to make several joints. The work is generally usual for the brigade in which there are such experienced specialists as gas cutters and truss builders A. S. Leshchenko, G. F. Alekseyev and S. P. Pasechnik and electric-arch welder A. L. Ashchuk.

"Things are looking good?" smiles the brigade leader, inviting us to look around at the unusual design of the burner. "It looks good."

And the problem of the burner at one time caused much concern among both the power engineers and installers. How was one to deliver gas to the burners of the boilers? There were two methods. The first seemed simpler: install an ordinary gas burner alongside the devices operating on solid and liquid fuel. The second method provided for development of a universal design. This was more complicated but nevertheless the power engineers selected the second method. This burner made it possible to standardize the autoregulation, shielding and interlocking system, which is important upon conversion from one type of fuel to another. Moreover, considerable conservation of funds was provided without a loss of reliability.

Practically all the collectives of the subcontracting organizations appreciably increased the rates of installation by the end of June. The fourth unit of the plant was ready for reception of gas and installation on the sixth unit was 80 percent completed. Main efforts were now directed toward the second unit, which had been left since the middle of June for scheduled major overhaul and renovation.

The laters are also confidently approaching the target. The main section of the gas line--from the zero mark, several kilometers from Gaysin to the Southern Bug in the region of Ladyzhin, has already been laid.

Construction of the gas line and work on conversion of the electric power plant to natural gas are approaching completion. The Ladyzhin GRES will be reborn during the 14th year of its existence.

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NON-NUCLEAR POWER

SUCCESSFUL INSTALLATION OF LEP-750

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Jul 84 p 1

[Article by A. Panchenko: "Success of the Installers"]

[Text] Construction of LEP-750 has begun in the Energodar Rayon at the Kakhovka Reservoir. This is a new, more powerful energy bridge for the Zaporozhe AES. It will have only three supports on the 5-kilometer "marine" segment.

Specialists of the Ukrainian department of the All-Union Institute Energoset'-proyekt and of the Kharkov Institute Ukrgidroproyekt proposed the original solution.

"We rejected immediately all the traditional methods of installing assembled steel sections at sea," relates the chief engineer of the footing project S. Kremer. "They were too expensive and were even more difficult to realize under conditions the stormy Kakhovka Reservoir. It was decided to make the concrete footings buoyant and to construct them on the bottom of a trench together with the masts. It was then filled with water, having removed the crosspiece, and the floating structures were towed to sea to the previously prepared site and were sunk."

Everything is very simple if one does not consider that the diameter of the barrel-like base is 40 meters, the height is 10 meters, the weight is more than 5,000 tons and a 126-meter metal mast is also resting on it. This giant is visible for 10 kilometers. The brigades of N. Kuznetsov and V. Yeftodiyev from the Construction Administration of the Zaporozhe AES and A. Vradiy, V. Gay and M. Grishanovich from the Energodar section of the Yuzhenergomontazh Trust installed it within a little more than 4 months instead of the allocated year. The secret of acceleration in installation is by consolidated blocks.

Specialists of the fifth detachment of underwater and hydroengineering operations, supervised by A. Zarey, labored simultaneously with the installers. Divers prepared "cushions" under the support footings on the bottom of the sea.

Everything was ready for the subsequent dump, but several days were required to wait for good weather at sea. And finally, the forecasters gave the "green

light." Powerful tugs slowly and carefully towed the support across the sea. This enormous installation was installed with a jeweler's accuracy on the prepared site. After a geodetic check, water was admitted to the open Kingston valves and the support arose on its permanent anchorage. The unique operation occupied less than 12 hours.

With startup of the first energy unit of the Zaporozhe Nuclear Power Plant, the LEP-750 will carry atomic energy across the sea to the country's Unified Energy System.

6521
CSO: 1822/14

NON-NUCLEAR POWER

CONSTRUCTION REPORT ON ZAGORSKAYA GAES

Khabarovsk TIKHOOKEANSKAYA ZVEZDA in Russian 8 Aug 84 p 3

/Article by A. Perevoshchikov: "The Zagorskaya GAES Is Being Built"/

/Text/ A 1.2 million kilowatt industrial GAES/pumped-storage electric power plant/, the first in our country, is being constructed close to the city of Zagorsk near Moscow. A pilot plant of this type is already operating in Kiev. The Zagorskaya GAES will become a testing ground for the development of plans for future GAES's in the European part of the country.

The GAES has been assigned a special role in the adopted USSR power program which is calculated up to the year 2000. The fact is that plans call for increasing electric power production in the European part of the country mainly with AES's/nuclear electric power plants/. Their optimum mode is an even load throughout the day. However, in practice, the requirement for electric power in this region changes during the day. GAES's also permit the most effective way to smooth out this unevenness. GAES's work as regular hydroelectric power plants during peak hours, with the only difference being that the water run-off is not discarded into a river channel but is accumulated in a so-called lower reservoir. At night the GAES, after receiving the excess electric power from the AES, pumps the water from the lower reservoir to the upper one, preparing for a new cycle. According to the estimates of specialists, GAES capacity in the European part of the country should be about 20 percent of the total capacity of AES's in this region.

What are the parameters of the Zagorskaya GAES?

The basin volumes: lower--33 million cubic meters, upper--30 million. The difference in water levels is 100 meters. Six units of 200,000 kilowatts each will be installed at the GAES. The length of the pipeline feeding water to the turbines is 740 meters and the diameter of its cross-section is 7.5 meters. All of the equipment installed at the plant has been domestically produced.

"The selection of this location in a flat part of the RSFSR was not accidental," says the chief of the construction project Vladimir Plotnikov. "We were governed by two considerations--the natural height drop and the possibility for the maximum utilization of local building materials (there is a sand and gravel pit not far from the construction site). In addition, a railroad and highway pass close by and only about 60 km of power transmission lines must be installed to switch the GAES into the Moscow system."

The pipeline is being assembled from large-section steel reinforced concrete rings which are made at the construction site. We are adding a concrete coating to the traditional steel ring which increases the reliability of the entire structure. We are using a powerful hoist for installing the rings which permits us to do the work on large height drops at any angle.

So-called finely-chipped concrete is being used for the construction of the Zagorskaya GAES. Fine particles are drawn off during the usual method of preparing the concrete mixture. We are using the fine chips as a dispersion aggregate. This will give the concrete the necessary firmness and frost-resistance which is especially important for the Zagorskaya GAES basins, since the range of the daily water level fluctuations in them is nine meters. Thus, the intermittently uncovered concrete basin surfaces will be subjected to low temperatures in the winter. The use of finely-chipped concrete not only increases the frost-resistance of the structure but also reduces the cost of the project by several million rubles.

Original technology is being used in the construction of the Zagorskaya GAES. Using a classic work system, the soil is packed in several layers 40 centimeters thick, and each layer at the same time is flattened to its full compaction. At the Zagorskaya plant a 6-7-meter layer of soil is packed down on its entire thickness by a 15-ton mechanism. Along with a 3-fold speeding up of the work tempo, we are also saving millions of cubic meters of soil because we are only removing the vegetation layer.

Now here are several words about the GAES equipment. We are using units operating in two modes: turbine and pump. This new high-quality hydraulic machinery model is sufficiently profitable. In addition, its use does not make us dependent on the state of the foreign market.

The probable reimbursement period for the plant is five years.

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ZAGORSK GAES SUBCONTRACTORS QUARREL, ENDANGER PLANT CORE

Leningrad LENINSKOYE ZNAMYA in Russian 31 Jul 84 p 2

/Article by A. Shabashkevich: "The Most Vulnerable Aspect"/

/Text/ Fifteen subcontractor organizations have been assembled at the Zagorskaya GAES /pumped-storage electric power plant/ construction site. Their names to some extent echo the map of the Soviet Union. The decision to concentrate such forces at the major project of the five-year plan was made by the association Soyuzgidroenergostroy /All-Union Association for the Construction of Hydraulic Power Projects/ and the USSR Ministry of Power and Electrification at the start of the critical year of 1984 with the goal of pushing forward the construction project to start-up at an accelerated pace.

In connection with this, the construction administration's technical planning services were given the task of clearly determining the future work volumes for each subunit and for providing new sectors and administrations with equipment, mechanisms, and motor vehicle transportation. However, up to now the construction project staff has not been arranging the required amount of resources.

However, perhaps the most critical problem is the coordination of the activities of the numerous subcontractors. Today it has not been solved. Mutual complaints--such is the tone of the conversation of the subcontractors at the Zagorskaya GAES construction site. The organizing role of Soyuzgidroenergostroy has also been little noticed here.

"This is laborious work--like building a house out of matches. And yet it also has to withstand all of the loads of a real structure. And if there is lightning, won't it burst into flame, like a match?"

"Yes, the analogy is close to the subject of this discussion," foreman Sergey Smirnov smiled, "really the core of the stator generator of the future GAES plant has been assembled manually from 300,000 plates, each 0.35 mm thick." Sergey put the palm of his hand on the rough wall of the core and continued:

"And it is vulnerable to strong electrical discharges like a match house, if it is not protected, of course. After assembly, the metal was calibrated and the special hydraulic plant was shaped. Now we will determine the quality of our work by reference points plotted on the metal. We will detect deviations from the prescribed parameters--the iron must be tightened and the core brought to a strict shape. In all, 150 control points have to be checked. The slightest mistake is intolerable. Its cost is the fate of the entire machine."

Let us add that the basic tests of the assembly quality of the core's stator generator are in the future. They will be conducted after the winding has been installed with special equipment supplied to the Zagorskaya GAES construction site from plant Uralelektrotyazhmash/Ural Electrical Machinery Plant/. At that time this painstakingly complex structure will be subjected to "lightning strikes"--high voltage will be fed to the winding. The core will be tested in modes close to emergency situations.

Sergey Smirnov, having plunged under the gangway surrounding the stator ring, brought out to us Nikolay Chereshnev, installer brigade leader--the hero of the day as Sergey introduced him to us.

I met Nikolay recently but I noted changes in his mood and in the manner in which he carried on a conversation. Yes, the last time he only had hopes for his work force and for the experience of the brigade members, but today he was confident of them. Several weeks ago Chereshnev's brigade started mixing the iron of the stator core. It was necessary to do this job in a record short period of time--two weeks. They practically had to complete making the stator under non-plant conditions. This was done for the first time in hydraulic power installation practice. The brigade was equal to the task. As a result, they gained very valuable experience in the rapid installation of a stator under construction conditions. Today one can speak about this with confidence. In the course of this work the installers made a number of adjustments, non-standardized equipment, all of which permitted them to keep within the particularly tight time periods. The results of the first tests indicate that the work was performed with a high degree of quality.

In assessing the total difficult situation which formed at the construction site, it is impossible to consider the success or failure of an individual collective without regard to the dependence on subcontractors. Their interaction decides many things.

Thanks to the activities of brigades of carpenter concrete workers of the basic structure administration and machine operators, conditions were created whereby Chereshnev's installers were able to demonstrate their skill, sharpness, and experience.

However, at the same time, another brigade of Spetsgidroenergomontazh/Specialized Hydraulic Power Installation Trust/, supervised by V. A. Troitskiy, is not able to display its best qualities today. The collective is doing construction and installation work at the GAES building. Because of the poor supply of materials and the disagreements with the actions of the carpenter cement workers and machine operators, the schedule has lagged considerably.

As a result, a third deadline for turning the transformer foundation and the passages between the temporary and permanent installation sites over for installation is being missed. Because of this, the success of Cherednov's brigade can also turn out to be in vain. The stator, which it has assembled, must be delivered on time to the work site. But the crane roads are not ready yet.

Often the solution of disputed subcontractor questions is delayed for a lengthy period of time. Obviously at projects where the interests of several organizations conflict, a plenipotentiary coordinator and arbitrator must be present; making decisions in the field, so to speak. The deputy chief construction engineer can be this person.

I am confident that the stator core, painstakingly constructed of 300,000 very delicate plates, is reliably protected from accidental damage. Quality installation guarantees this. The most vulnerable aspect of this business is the disagreements of the subcontractors on whom the further fate of the machine depends.

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BRIEFS

STAVROPOLSKAYA GRES SHIFTS TO GAS--Solnechnodolsk (Stavropolskiy Kray)--All eight of the power blocks of the Stavropolskaya GRES/state regional electric power plant/ have been shifted from mazut to cheaper natural gas. This will allow 80,000 railroad tank cars per year to be freed up for the transportation of other freight, will increase the dependability of the plant's operations, and will decrease harmful emissions into the atmosphere. It was projected that the technical re-equipping of the plant would be completed only next year. However, the builders, with the active assistance of the operational personnel, have outstripped the schedule and have handed over the feeder gas pipeline and the equipment complex to a state commission ahead-of-schedule. It is important to point out that the gas jets and gas distribution systems have been installed without dismantling the mazut fuel equipment. It can be operated again in case of need. /by A. Yemtsov/ /Text/ /Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Aug 84 p 2/ 8524

CONCRETING KRAPIVINSKAYA GES DAM--(Kemerovskaya Oblast)--The vehicle driver increased the rotations and the body of the KamAZ/vehicle produced by the Kama Motor Vehicle Plant/ began to rise slowly. The bucket is filled with concrete. The crane picks it up and moves it to the site where the concrete is being laid. A plaque is laid which indicates that the concreting of the Krapivinskaya GES/hydroelectric power plant/ dam on the Tomi River began on August 24, 1984. The installer brigade of Mikhail Merzlyakov won in intensive socialist competition the honored right to lay the first concrete. The purpose of the Krapivinskiy hydraulic development is to supply Kemerovo and Tomsk with water and to give new life to the small Inya river. They have to build a dam which is 69 meters high and one and a half km long. Some 600,000 cubic meters of concrete will go into it--more than during the construction of the Tsimlyanskiy, Novosibirskiy, and Tash-Kumyrskiy hydraulic developments. /by V. Bobrov/ /Text/ /Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Aug 84 p 1/ 8524

KRIVOPOROZHSKAYA GES SPILLWAY CONSTRUCTION--Petrozavodsk (LENINGRADSKAYA PRAVDA)--The laying of concrete has begun on the next project of the Krivoporozhskaya GES under construction--the erection of the spillway. This plant will become the largest not only among the GES's of the Kemskiy cascade but also in Kareliya. The builders' job is difficult: almost 20,000 cubic meters of concrete are necessary for the construction of the spillway. The total requirement is to lay 100,000 cubic meters of cast-in-situ hydraulic concrete for the construction of the plant's main structures. /Text/ /Moscow SOVETSKAYA ROSSIYA in Russian 16 Sep 84 p 2/ 8524

SAYANO-SHUSHENSKAYA GES EQUIPMENT DELIVERIES--Leningrad (TASS)--With the shipment to the Sayano-Shushenskaya GES of a generator equipment complex, the Leningrad enterprises yesterday completed the delivery of equipment for the eighth unit of this plant. The specified deadlines were met through the creative cooperation of all participants in the plant's construction! the basis has been created for the ahead-of-schedule start-up of the 640,000 kilowatt unit this year already. A coordinating council has adjusted the schedules for delivering turbine, generator, and other equipment parts, keeping account of the needs of the builders and installers. The fulfillment of the agreed-upon obligations has become the main point in the summing up of socialist competition. The collectives of the enterprises have found reserves to speed up the work. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Sep 84 p 1] 8524

MISCELLANEOUS POWER DEVELOPMENTS--The Kurpsayskaya GES has been brought to its planned capacity of 800,000 kilowatts. This will relieve the peak loads on the power system of Kirgiziya and will increase the delivery of power to the republics of Central Asia and Kazakhstan. The four-millionth ton of transformer steel was manufactured at the Novolipetskiy Metallurgical Combine. Power has been fed over the 110-kilovolt Zima-Balagansk power transmission line to Irkutskaya Oblast. The installers erecting the high-voltage lines in the area of BAM[Baykal-Amur Railroad] constructed it in a compressed time period. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 84] 8524

PERMSKAYA GRES GAS SUPPLY--Perm--Sectors of the Urengoy-Center gas mains passing through the Kama area have facilitated the solution of yet another important national economic problem--the uninterrupted supply of fuel to the Permskaya GRES under construction, the largest in Europe, whose planned capacity should be 4.6 million kilowatts. In order to fully obtain Siberian gas for the needs of the Ural GRES, it was decided to construct a 140-km steel line to it from the main gaslines. The pipeline must come into operation now and, for this reason, the installation sector collectives of V. Lyadov and R. Khafizov from the Perm specialized administration of the trust Tatneftegeprovodstroy[Tatar Pipeline Construction Trust] have been commissioned to install it at an accelerated tempo toward two flows. Today the workers of S. Shindanovin's brigade are already installing the line portion. Several installation brigades are still being assembled for the work sites. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 7 Sep 84 p 1] 8524

NIZHNEKAMSKAYA GES DEVELOPMENTS--Frezhnev (Tatar ASSR)--The installation of the fifteenth and next-to-last unit has been completed at the Nizhnekamskaya GES. The specialists needed less than two months to install the electrical machinery which weighs more than 500 tons. The installers, because of specialization at the preparatory stage, speeded up the work by almost two weeks. They assembled the enlarged units simultaneously with three brigades. The hydraulic development on the Kama is being built and is operating. Fourteen units, in operation since the start-up day, have generated more than five billion kilowatt hours of electric power. With the start-up of the last turbine, the capacity of the GES will be 1,248 thousand kilowatts. Putting the plant into operation will noticeably improve the power supply of the developing Nizhnekamskiy territorial and production complex. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 13 Sep 84 p 1] 8524

NOVOSIBIRSK TETS-5 CONSTRUCTION--Novosibirsk--The installation of the first power block began at TETs/heat and electric power plant/-5 under construction in the city. The planned capacity of the plant is one million kilowatts. Putting it into operation will also improve the heat supply of the housing areas and industrial enterprises of the oblast center. Plans call for the burning of "liquid" coal--a specially prepared water-coal suspension--in the TETs boilers. A 250-km long coal pipeline is being installed to supply coal from the Kuzbass. /Text/ /Baku VYSHKA in Russian 18 Aug 84 p 1/ 8524

POWER LINE CONSTRUCTION--(TASS)--Construction of the 6-kilometer crossin of Kakhovskoye Reservoir on the electric power transmission line with voltage of 750 kilovolts has entered the final stage. The builders have towed to the stormy sea and installed on its bottom the first of three gigantic supports. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 31, Jul 84] 6521

POWER SUBSTATION--Serakhs Rayon in Southern Turkmenistan has been transferred to a reliable power supply. A power substation and the 64-kilometer Tedzhen-Serakhs LEP-110 has become operational here. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 3] 6521

NOVOCHERKASSK GRES--Rostov Oblast--Half of the energy unit of the Novocherkassk GRES is operating on the new system of proportioning and delivery of coal fines to the burners. The specialists call it the "liquid coal" technology. There is a direct advantage: the annual consumption of fuel is reduced by 500 tons per energy unit, while the consumption of electric energy for internal needs is reduced by 700,000 kilowatt-hours. The author of the innovation is Candidate of Technical Sciences A. Novikov. Complete conversion of the Novocherkassk GRES to generate electric power using the new technology is planned for completion in the near future. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Jul 84 p 2] 6521

LADYZHIN GRES--Vinnitsa--Renovation of the Ladyzhin GRES is being completed. The 25-kilometer branch from the major gas pipeline Soyuz has approached the thermoelectric power plant. It is being converted to natural gas. According to the calculations of economists, conversion of the station to gas will appreciably reduce the specific consumption of conventional fuel and the cost of a kilowatt-hour will be 1/1.5 as much. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 15 Aug 84 p 1] 6521

TASH-KUMYR GES--The first cubic meter of concrete has been poured into the foundation of the machine building of the Tash-Kumyr GES, which is being erected on the Naryn River (Kara-Kul, Kirgiz SSR). The Tash-Kumyr GES with output of 450,000 kilowatts will provide enterprises of the Issyk-Kul territorial-industrial complex with electric energy. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 27, Jul 84] 6521

NOVOANGRENSKAYA GRES--Nurabad, Tashkent Oblast--Installation of the turbine and generator with output of 300,000 kilowatts is being completed at the Novoangrenskaya GRES. The first energy unit of the plant is planned for startup at the end of September. The GRES, which will use coal from the adjacent Angrenskiy mine as fuel, will have eight units with a total output of 2.4 million kilowatts. [Text] [Baku VYSHKA in Russian 10 Jul 84 p 1] 6521

EKIBASTUZ GRES--Pavlodar Oblast (TASS)--Bringing the first section of the superlong-range Ekibastuz-Urals electric power transmission line up to design voltage of 1,150 kilovolts is approaching. Testing of the transformers under load was begun yesterday at the substation of GRES-1. The efficient equipment of the substation will permit delivery of current of the Ekibastuz GRES to more than 1,500 kilometers--to Chelyabinsk. The losses of electric power due to the high voltage will be one-third as much than at existing LEP [electric power transmission line]. Specialists of the Elektrosredazmontazh Trust, together with representatives of the manufacturing plant and designers, have worked out an accelerated schedule for assembly of the units and have strengthened the brigades with experienced engineers. This made it possible to install and adjust the equipment in large blocks, gaining a several hours advantage for each operation. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Aug 84 p 1] 6521

POWER TO NAKHICHEVAN--7 Jul 84 (TASS)--Reliable supply of the Nakhichevan ASSR with electric power will be aided by the 100-kilometer electric power transmission line that links the autonomous republic with the Armenian SSR. Current was delivered today from the Armenian energy system to the enterprises of Nakhichevan. Energy was transmitted over a 220-kilovolt line, the supports of which passed through the Araks River valley, jumped the thousand-kilometer height of the horns of the Lesser Caucasus Range, the mountain rivers and canals. The new power line has come to replace the old low-power line. This was caused by the ever increasing needs of a number of sectors of industry for energy. [Text] [Moscow PRAVDA in Russian 8 Jul 84 p 2] 6521

6521
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PIPELINE CONSTRUCTION

DEPUTY MINISTER DISCUSSES PIPELINE CONSTRUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Sep 84 p 1

[Article by Grigoriy Nikolayevich Sudobin, deputy minister of the Ministry of Construction of Petroleum and Gas Industry Enterprises (Minneftegazstroy): "The Gas Mains Are Going Into Operation"; under the rubric: "Today Is Oil and Gas Industry Workers' Day"]

[Text] Minneftegazstroy subsections have been working with oil and gas workers on realization of the USSR Power Program. More than once our newspaper has recounted the successes of the builders of the unique gas mains which originate at the famous Urengoy oil field. Industry construction workers must build around 14 thousand kilometers of oil and oil-product pipelines during this five-year plan period. About 11 thousand kilometers of these pipelines are already in operation.

G. Sudobin, deputy minister of the Ministry of Construction of Petroleum and Gas Industry Enterprises discusses the progress of construction work on the main oil and product pipeline routes.

A considerable portion of the Kholmogora-Klin oil main, which has an overall length of 2,500 km, will be put into operation in the next few months. The new pipeline has enormous significance for the national economy. It will bring oil from Western Siberia to the Ural, Volga and Center oil refineries of the country, greatly reducing the railroads' work load.

If we're speaking of the most outstanding collectives, then in first place we'd have to name subdivisions of Glavvostoktruboprovodstroy [Main Eastern Pipeline Construction Association]. On their section they have completed testing on more than 500 km of the pipeline and have begun running oil into it. Tyumen construction workers have almost fulfilled their assignment. Quite soon after completion of the Urengoy-Center-2 gas pipeline, rates for laying the pipeline to the central areas of the country, where Glavtruboprovodstroy [Main Pipeline Construction Association] and Glavukrneftegazstroy [Main Oil and Gas Construction Association of the Ukraine] are working, will speed up quite a bit.

The oil pipeline will be ready to take on oil along all its runs in the first half of next year.

In the next few years, Western Siberia should become a supplier not only of oil and gas, but of other hydrocarbon products. As the geologists are confirming, we have only peeped behind the edge of the curtain hiding the area's wealth. Everyone knows Urengoy to be a great storehouse of gas. But oil has turned up along with gas as one of its mineral resources. And even deeper, according to the specialists, the horizons are saturated with condensate. Kerosene, gasoline and diesel fuel can be extracted from it after only minor refining. In Urengoy there's already a pilot plant in operation which is coming up with gasoline and solar oil under local conditions. In the Urengoy region alone, condensate recovery amounting to millions of tons per year is scheduled for upcoming years.

Minneftegazstroy construction workers, working jointly with other ministries and departments, are to erect huge refineries in the tundra--a complex of installations for condensate stabilization along with auxiliary structures and facilities, and are to put over 700 km of condensate pipeline, from Urengoy to Surgut, into operation this year.

And another of this year's important construction projects is the Western Siberia-Ural-Volga petroleum products pipeline. This route is intended for the transport of hydrocarbon products from Western Siberian gas refineries and the condensate-stabilization installation in the Urengoy gas-condensate field to the Ural-Volga region.

The product pipeline is being built by collectives of subsections of six central boards. The Siberian construction workers are completing the line work on their section and are preparing to test the pipeline. Glavvostoktruboprovodstroy [Main Eastern Pipeline Construction Association], Glavtruboprovodstroy and Glavyuzhtruboprovodstroy [Main Southern Pipeline Construction Association are somewhat behind in developing their flow line operations.

The Travniki-Kustanay product pipeline, along which fuel will be transported to consumers in the Chelyabinsk Oblast and Kazakhstan, is being laid ahead of schedule. The Sineglazovo-Sverdlovsk oil products pipeline has been put into operation, and the Novki-Ryazan product pipeline is being laid at full speed.

Using their advanced experience, accumulated while building the giant pipelines, these competition leaders are exemplary at their work and on oil industry projects.

As an example, the Mosgazprovodstroy [Moscow Gas Pipeline Construction Association] Trust flow collective, headed by A. Buyankin, has reduced its work force to half as many personnel, and increased its volume of completed work two-fold. The collective completed work on its section ahead of schedule and is now constructing the Kholmogory-Klin oil pipeline. This is the result of working by an integral-process contract. The aggregate finished-output collective, headed by Hero of Socialist Labor and Delegate to the RSFSR Supreme Soviet N. Nezhdanov, is completing almost 3.5 million rubles' worth of "turnkey" work on construction of gaslift compressor stations in the Samotlor oil field. Wages for the brigade are paid just like Anatoliy Buyankin's brigade--

on a single work order. N. Nezhdanov's brigade initiated an industry-wide competition for careful expenditure and economy at each work site.

Naturally, such large construction jobs are not done without problems and difficult questions. For instance, USSR Minchermet [Ministry of Ferrous Metallurgy] was quite late in deliviries of pipe for the Western Siberia-Ural-Volga plants. Minnefteprom planning organizations didn't go over the questions of testing and filling the pipeline until the very end of the job.

Nevertheless, based on the shock work of Minneftegazstroy collectives, we can say that all pipeline transport facilities will be put into operation on or ahead of schedule.

12659
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PIPELINE CONSTRUCTION

PROGRESS IN BUILDING OIL, GAS INDUSTRY FACILITIES REVIEWED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 8, Aug 84 p 1

[Editorial: "Ways of Accelerating Scientific and Technical Progress"]

[Text] Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] has been assigned an important role in taking steps to speed up scientific and technical progress. In some industries that define the growth rate of the country's economy, progress depends upon how effective is the work of its subunits.

Minneftegazstroy has held an expanded session of its board, at which fulfillment of the CPSU Central Committee and USSR Council of Ministers decree on measures for accelerating scientific and technical progress in the national economy was examined.

Present at the board meeting were responsible workers of the CPSU Central Committee, the USSR and RSFSR Councils of Ministers, USSR Gosplan, USSR Gosstroy, the State Committee for Science and Technology, Minneftegazstroy, Mingazprom [Ministry of Gas Industry] and Minnefteprom [Ministry of Petroleum Industry], prominent scientists of the USSR Academy of Sciences and of the industry's science, and managers of main administrations, associations and trusts.

USSR Minister of Construction of Petroleum and Gas Industry Enterprises V. G. Chirskov opened the meeting. First Deputy Minister G. I. Shmal' delivered a report.

The industry uses the specific-purpose program method for planning scientific and technical progress. Ministry subunits are taking part in carrying out the tasks and stages thereof for 23 All-Union and 20 industry scientific and technical programs in 1981-1985. The most important of these are aimed at creating progressive machinery, technology and work-organization methods that will increase the construction pace for high-capacity pipelines between West Siberia and the country's Central Economic Region and outfitted-module compressor stations, and at forming a regional production complex in the West Siberian area.

The most important task in helping to speed the introduction of science's newest achievements and advanced experience is the wide use of microprocessor equipment, robotics and automated production facilities.

A set of machines has now been created for erecting pipelines up to 1,420 mm in diameter that will enable all the line work to be mechanized; more than 1,000 km of pipeline have been welded by new Sever and Styk welding sets; swamp travelers of 36-ton load capacity, a catamaran-type suction dredge and many other machines have been created; a new technology has been implemented for obtaining insulating tape; high-class heat-insulating materials have been developed; and a number of developments that will yield substantial benefit have been worked out.

In surface construction, the outfitted-module method has been further developed and basically new engineering solutions have been established for erecting gas-field installations. Measures aimed at saving supplies, equipment, fuel and power are constantly being taken.

The board noted that some developments do not find rapid application in the industry. Some subunits introduce new welding equipment poorly, and the manufacture of a mobile complex for resistance welding of small-diameter pipe with mill-applied insulation is being delayed. Equipment for outfitted-module construction needs improvement, and important problems in the area of improving the management mechanism for this construction must be solved.

There are still large unused reserves in the activity of institutes and design bureaus. The industry's scientific potential is not being used with adequate effectiveness, and there are developments that have poor prospects and are low in productivity.

The managers of Minneftegazstroy scientific-research, design-development and production subunits who spoke at the session examined ways for introducing progressive machines, equipment and technology most rapidly.

USSR Minister of Construction of Petroleum and Gas Industry Enterprises V. G. Chirskov dwelt in his concluding address on existing reserves for improving scientific and design developments and for increasing construction efficiency, and he elucidated on specific measures for accelerating scientific and technical progress within the industry.

The board adopted a special resolution aimed at further improving the work of introducing the newest achievements of science, technology and advanced experience at all subunits.

* * *

One of the most important directions of scientific and technical progress in the industry is that of increasing the efficiency of the outfitted-module method. A collection of articles in this issue of the journal is devoted to experience in introducing the method and to the problems of improving it.

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PROGRESS IN DEVELOPING OUTFITTED MODULES ANALYZED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 8, Aug 84 pp 2-4

[Article: "Urgent Tasks in Developing Outfitted-Module Construction"]

[Text] The CPSU Central Committee and USSR Council of Ministers Decree, "Improvement of the Planning, Organization and Management of Capital Construction," pointed out the need to develop industrialized construction methods as a basis for raising construction-work effectiveness, reducing construction time and improving work quality.

The main direction in industrializing industrial construction now is that of developing and widely applying industrialized construction systems. These systems are creating more favorable conditions for the factory manufacture of large construction-operations modules, shipment of the modules as outfitted units to the construction project, and the accelerated erection of buildings and structures, thanks to the purposeful improvement of design and development solutions.

The outfitted-module method of construction that was developed and introduced in Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] about 20 years ago was, in essence, our country's firstling of industrialized construction systems. The unified engineering policy that the ministry follows in the area of industrializing the construction of surface structures is based upon an expansion of the volume to be introduced and further improvement of this method.

The industry has now created a specific production complex of outfitted-module construction that is still unique in this country and which includes: the experimental production-type construction and installing association Sibkomplektmontazh and eight mobile outfitted-module construction trusts, with their own assembling and outfitting enterprises (SKP's); a number of regional trusts specialized in site preparation and the below-grade cycle of construction; industrial enterprises of the Soyuzneftegazstroykonstruktsiya Association for the manufacture of outfitted structure, panels, pipe components, containerized-module housing and other modularized output; scientific-research and design-development subunits of VNIIST [All-Union Scientific Research Institute for Trunk Pipeline Construction], SibNIPIgazstroy [Siberian Scientific-Research and Design Institute for the Construction of Gas-Industry Enterprises], the EKB [Experimental Design Bureau] for Reinforced Concrete,

the SPKB [Special Design Bureau] of Proyektneftegazspetsmontazh [Design Office of the Main Administration for Installing Operating Equipment at Facilities of Oil and Gas Industry Enterprises of the RSFSR Ministry of Construction], and NIPIorgneftegazstroy [Scientific-Research and Design Institute of the State Trust for Industrializing the Construction of Oil and Gas Industry Facilities], which are engaged in developments in the area of integrated-module construction.

The work experience of Sibkomplektmontazh, which was established in Tyumen, testifies to the vitality and promise of this organizational structure, not only for the conditions for building oil and gas industry facilities in West Siberia but also in other parts of the country during the construction of facilities for various branches of the national economy.

The specifics of industrial production engendered in Sibkomplektmontazh and other mobile trusts progressive internal tendencies that promote a continuous reduction in the use of live labor at the construction site.

The amount of outfitted-module construction within Minneftegazstroy grows each year. While in 1980 the total amount (in terms of prime production costs) was 625 million rubles, in 1983 it reached 800 million rubles.

The ministry has developed and is implementing an "Interagency Specific-Purpose Scientific, Technical and Production-Economics Program for the Further Development (Prior to 1985) of the Outfitted-Module Construction of Oil and Gas Industry Facilities."

More than 6,000 modules and box-modules for industrial-production purposes, more than 2,000 VZhK modules, 2,500 SKZ [folding-building] sections, and 1.6 million square meters of wall panels, roofs and ceiling floors were manufactured in 1983. Work was done to improve the production capacity of prefabricating and outfitting enterprises and BKU [outfitted-module installation] plants. Unified designs for UKPG's [integrated gas-treatment installations] and KS [compressor stations], in which progressive three-dimensional layout solutions were used, were developed and introduced at the Urengoy field and during construction of the Urengoy-Uzhgorod and Urengoy-Central Economic Region gas pipelines. UB and BIV [variable-height module] type boxes that were developed by the EKB for Reinforced Concrete, unified structure for SibNIPIgazstroy modules, and so on have been introduced. Work has started on the introduction of supermodules for building up the Yamburg field's facilities.

Realization of the indicated program will pave the way for the timely and ahead-of-schedule introduction into operation of oil and gas production capacity. The outfitted-module method of construction has enabled the ministry to resolve a number of specific tasks in developing the oil and gas fields of West Siberia and other regions and in creating the most important oil and gas pipeline systems. It is this progressive, highly industrialized construction method that has provided a high pace for the erection of gas and oil field facilities and compressor stations on the Urengoy-Central Economic Region and Urengoy-Uzhgorod gas-pipeline systems, oil-repumping stations and other facilities.

The outfitted-module method becomes of special significance in light of the tasks set for Minneftegazstroy for the 12th and later five-year plans for further developing the country's fuel and power complex.

The annual amounts of work spent in erecting surface oil and gas facilities will in the long term more than double 1984's. Construction time for surface facilities is to be almost halved and the line and surface portions of trunk pipelines are to be introduced simultaneously. Therefore, not only is a maximum expansion in the scale of outfitted-module construction required, but it must also be brought up to a technical level that conforms with the advanced achievements of science and technology.

As is known, the first step in introducing the outfitted-module method of construction in Minneftegazstroy was, from the viewpoint of three-dimensional layout solutions, breakdown of the operating set of equipment of the given facility into parts transportable by existing types of equipment. As a result, labor expenditure at the site was reduced 40-50 percent.

The second step was the introduction of more modern three-dimensional layout solutions: a cellular configuration, using existing types of operating equipment. Labor expenditure at the installing site was cut 15-20 percent more.

The second step in introducing the outfitted-module method was the realization stage.

The third step of development of the integrated-module method, which is starting, calls for improvement in engineering solutions of outfitted-module installations in terms of making the tie-in with the operating and other equipment that is being built. Realization of this step will enable labor expenditure at building sites to be reduced 20-25 percent more, that is, it will transfer to the factory more than 90 percent (in terms of labor expenditure) of the operations that are performed at construction projects under the traditional method of construction.

A procedure for perfecting newly created equipment for oil and gas facilities with a view to making its installation feasible under outfitted-module construction must be introduced.

The corresponding requirements have been formulated and they call for:

--the creation of basically new equipment for outfitted-module construction that is distinguished by higher unit capacity (in combination with miniaturization of its components) and which is equipped with automatic vibration suppressors and can operate reliably in an automatic mode without expensive buildings and shelters;

--the aggregating of the equipment for various functions into large transportable modules;

--conversion from the siting of equipment in buildings to siting it outdoors, to the use of containerized modules, and to a compact individual shelter configuration;

--a reduction in auxiliary systems, based upon a raising of the degree of autonomy of equipment operation and the use of intermediate reactant systems;

--simplification of engineering-support systems at compressor stations, pump stations and integrated gas-treatment installations, by raising the degree of autonomy of the units, expanding the area of application of air systems for cooling, prestartup electrical heating, schemes with heat recovery, and so on;

--centralization of operational repair services based upon increased automation and remote control of operating processes and the wide introduction of component and assembly repair and of duty-shift servicing;

--the development, validation and introduction of reduced norms for intervals between structures;

--conversion from traditional operating schemes for doing preventive maintenance during oil and gas facilities construction to new schemes that exclude the need for the use of overhead-traveling cranes in buildings that house gas and oil pumping units and of repair modules at each station; and

--the introduction of a new principle for forming operating units and for designing construction-operations type sectional modules and buildings made of them that would provide for an organic merging of load-bearing and enclosure structure for units and sectional modules, with maximum use of the dimensions permissible under the provisos for transporting sectional modules from the assembling and outfitting enterprise to the construction site.

The state standard that governs the procedures for shipping industrial output to a production facility includes a requirement for coordination of primary documents with the installing organizations. The potential thus opened up for increasing the installation feasibility of equipment for oil and gas facilities must be used more actively.

The industry's prime outfitted-module construction institute, SibNIPIgazstroy, should be in charge of developing the standardizing documents that regulate this new procedure and insure their coordination and approval and of introducing them widely during the 12th Five-Year Plan.

Important tasks face production workers and the industry's science in regard to providing for an advanced technical level at prefabricating and outfitting enterprises, where the increasingly large number of construction processes is concentrated as industrialization proceeds. The machinebuilders' achievements in creating a flexible grouping of operations for the manufacture and assembly of small-series items must be mastered. Main attention should be paid to organizing workplaces scientifically and supplying them with the smaller types of powered equipment.

Simultaneously, in order to cut the products mix, it is desirable, in accordance with the instrumentmakers' example, to introduce restrictive standards on the equipment, articles, box-module members and outfitted modules shipped and to decide on the three-dimensional layout solutions for facilities. This will enable the replacement of the uncoordinated systems of boxes and box

modules developed by Minnef ·gazstroy and client-ministry institutes and the forming of a single system of unified parts, components and modules that will create favorable conditions for their manufacture at the factory and for shipping them fully outfitted.

In order to solve the problems of introducing simultaneously the line and surface portions of the facilities, a restructuring of the existing practice of planning and improvement in the management of integrated-module construction are required. A number of required planning-management procedures either are not being carried out at all at present, or they are carried out with the use of inadequately justified methods and standards.

Thus, during planning for development of an industrialized base for outfitted-module construction, SibNIPIgazstroy up until recently was using obsolete standards for module-output requirements. These standards did not consider a number of new areas for the use of BKU's, such as in the engineering buildup for housing complexes in West Siberia, operational-services modules for compressor stations, facilities for the hydraulic transport of coal, and so on. The consequences of this was an understating of the requirements, a weakening of attention to development of the industrializing base, an increase in the shortage of capacity in West Siberia, and reductions in the level of industrialization and in the construction pace for surface facilities.

The conclusions about further paths for developing the outfitted-module method (questions of specialization, centralization and decentralization), based upon obsolete standards, have proved to be unacceptable.

Glavneftegazstroymaterialy [Main Administration for Producing Building Materials for the Construction of Oil and Gas Industry Enterprises], GUKS [Main Capital Construction Administration], SibNIPIgazstroy and VNIIST must eliminate deficiencies in planning the industrializing base as quickly as possible.

The control figures for developing the industry up to the year 2000 and the increased amounts of introduction by the outfitted-module method that is connected therewith is convincing of the need for intensive growth in the efficiency of assembling and outfitting enterprises and of mobile trusts.

Not everywhere are these trusts being used satisfactorily. For example, the workload for a mobile trust in Glavyuzhtruboprovodstroy [Main Administration for Pipeline Construction in the Southern Economic Region] was 85 percent line-type pipeline construction, while in Glavneftegazstroy [Main Administration for the Construction of Oil and Gas Industry Enterprises] and Glavukrneftegazstroy [Main Administration for the Construction of Oil and Gas Industry Enterprises in the Ukraine] it was 30-40 percent. Such a situation is often explained by the lack of the required amounts of work, although the amounts of planned introduction by the outfitted-module method are lower than called for in the specific-purpose program indicated above. Thus, in accordance with the ministry's approved program and directive, 1.1-1.2 million rubles' worth of construction and installing work that uses the outfitted-module method must be done in 1985. In 1983, 800 million rubles' worth was performed, while in 1984 only 840 million rubles' worth is planned. The existence of understated, undemanding plans has not stimulated active work with the clients, according to an analysis of design documentation for excluding the

traditional versions of facilities if modular versions exist. For example, Trust No 15 of Glavneftegazstroy could have used 110 box modules in 1984 instead of the specified 40. The situation is also similar in other Glavneftegazstroy trusts.

At the same time, the assembling and outfitting enterprises of this main administration have a low workload level. For 1984 the main administration has planned an amount of box-module introduction per estimated 1 million rubles' worth of construction and installing work that is half that of 1981. For the industry as a whole, the specific indicator of the use of box modules per estimated 1 million rubles' worth of construction and installing work was reduced by 12 percent in 1983 versus 1981. Facilities that are new for the industry, including gas filling stations, are being designed as nonindustrialized models. This has necessitated the hiring of many additional workers at the projects and, of course, it did not promote an accelerated construction pace.

In order to avoid similar negative trends later, the approach to planned tasks in terms of amounts of outfitted-module construction for main administrations and trusts must be changed. These tasks should be strenuous and differentiated as a function of the mix of facilities being erected and should be coordinated both with the programs for building facilities and putting them into operation and with the actual ceilings on labor resources. VNIIST should prepare a methodology and standards for such planning.

Most important prerequisites for accelerating the pace of construction of surface facilities is the timely outfitting of box modules with equipment at the assembling and outfitting enterprises and their delivery to the site, completely outfitted, and with the maximum amount of factory manufacture.

Previously, during the two-year period for building facilities by the traditional methods, a delay of 2 or 3 months in the delivery of equipment for pump and compressor stations, for example, exerted little effect on the technology for doing the work, since it was almost always possible to compensate for this delay. Now, when the plan year is simultaneous with the year of start and completion of the facility, such a possibility is absent. Therefore, questions of outfitting facilities at assembling and outfitting enterprises will become decisive.

Planning the outfitted delivery to construction sites of modules with a high degree of factory preparation is a new and practically undeveloped task. Right now orders for similar equipment for a number of projects that are situated within the regions--the areas of activity of mobile formations--are sent by various client subunits. Then each facility is outfitted independently, and the equipment is dispersed. The potential for priority outfitting of projects that are due for early startup by concentrating there all the equipment that comes to the region is not always being used.

Experience indicates that the outfitting task is solved satisfactorily where supervisors of construction organizations and assembling and outfitting enterprises show the required initiative and persistence and where the concrete solutions are mutually acceptable with the clients.

Thus, the Sibkomplektmontazh Association, in manufacturing substantially more box modules than Soyuzgazpromstroy [All-Union Association of the Ministry of Construction of Petroleum and Gas Industry Enterprises] and Glavneftegazstroy did between the two of them, has basically resolved the outfitting problem, while these two organizations send box modules to the place of installation without the equipment.

It is necessary to study and disseminate advanced experience and persistently seek out ways for concentrating outfitting articles in the regions at the priority construction projects.

It is desirable to think out anew the proposal to convert to the outfitting of facilities with equipment by mobile trusts in accordance with orders sent by the clients. Shipments must be made on time and be adequate for the manufacture of box modules at assembling and outfitting enterprises and for their timely delivery to the facilities. It is necessary simultaneously to substantiate the sizes of the reserve stocks of articles and components.

Solution of the problem of simultaneously putting the linear portion and the surface structures into operation requires increased attention also to such managerial tasks as improving the structure of the industry's complex for building outfitted modules and insuring the specific conjunction of plans for shipments and plans for achieving the technical and economic indicators for the activity of the trusts and associations. Advanced builders' experience indicates that, as the pace of the work is raised, and because of introduction of the construction commodity output indicator, the center of gravity for the job of formulating the plan for the "commodity" is shifted to the production services, which know better the state of affairs at construction projects, have information about the clients' actual potential for shipping the equipment, and take part in making up lists of contruction projects and designs for the organization and performance of the work. It is this plan also that should be the basis for providing for the specific conjunction of the enumerated plans.

In some advanced branches of the economy its development is charged to the production-management services. Minneftegazstroy has gained experience in developing designs for organizing the work on both the linear and the surface portions of trunk pipelines. This experience can be the basis for planning the industry's contract activity, which is aimed at solving the indicated problem.

As the share of equipment in the budget cost of the facilities grows, and because of the industrialization and transfer of installing work to assembling and outfitting enterprises, the role of Sibkomplektmontazh and of mobile trusts and associations for the accelerated introduction of facilities into operation is growing. The task of raising their responsibility for the final construction result by transferring to them the functions of the leading installing organizations is urgent. Methods for solving it were discussed by a section of the ministry's Scientific and Technical Council.

The suggestions by Sibkomplektmontazh and Spetsstroymontazh [Specialized Construction and Installing Trust] about performing a series of economic experiments at a number of facilities were adopted. This work must be accelerated.

It should be more to the point to work on the conversion from individual modular objects to completely modularized facilities and other structures.

At the current stage of outfitted-module construction, the task of establishing stable prices for oil and gas facilities and of using them as a basic criterion for labor-productivity growth and profitability, with savings from reducing expenditures for material and labor resources to be used as a source of incentives for collectives of builders, suppliers, researchers and development workers, is becoming of special importance. The results of the Belorussian experiment indicates that this approach helps greatly to reduce the materials intensiveness of facilities even where the construction ministry does not have its own design bureaus and design-development workers. Minneftegazstroy should expect a much greater benefit.

The activeness of cost accounting and especially of the brigade contract must be intensified.

The outfitted-module method is a method for realizing specific tasks entrusted to the ministry for the construction of surface facilities. In the foreseeable future Minneftegazstroy, despite the substantial growth in the amounts of work, will not have enough sources for covering the growing shortage of worker personnel. Accelerated introduction of measures for scientific and technical progress is the sole path to meeting the goals set for the industry.

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TECHNICAL PROGRESS IN OUTFITTED-MODULE CONSTRUCTION ANALYZED

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[Article by V. A. Alyutov of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises]: "Accelerated Scientific and Technical Progress in Outfitted-Module Construction"]

[Text] The oil and gas construction industry is among the newest branches that produces both the technology used and the objects themselves of the work being done--systems that recover and transport hydrocarbons. Scientific and technical progress in oil and gas industry construction is proceeding at such a rapid pace and with such deep restructurings of production forces and frequent qualitative leaps in equipment and technology that the notion of a scientific and technical revolution is completely justified here.

The need for such vigorous development of the industry is stimulated by the requirements for realization of the Energy Program: to increase the capacity of the oil and gas industries at a rapid pace, and to provide for a restructuring of the country's fuel balance through an increase in the share of oil and gas.

The December 1983 CPSU Central Committee Plenum set a concrete task--to increase labor productivity above the plan by 1 percent and to reduce prime production costs by 0.5 percent.

It is clear that this formula, which is purposeful and comprehensive in its content, should be realized mainly on the basis of new technologies and engineering solutions, maximum mechanization and automation of technological operations, and precise organization of the work at all operating levels.

Scientific and technical progress is today rightly becoming a main component in successful development of the economy. During the past decade the use of new technology and scientific organization of work have provided 67 percent of the overall growth in labor productivity in industry and in construction. Expenditures for new equipment are recouped twice as rapidly as capital investment in new construction.

Scientific and technical progress in oil and gas industry construction is related to the engineering policy of its clients and helps in its realization. And this is a most important factor in the Minneftegazstroy collective's activity.

By creating fixed capital for oil and gas recovery and transport and by building up their production potential, the industry gives impulse to the development of the oil and gas industry, and in some cases also, of large regions of the country (the North of West Siberia and the Mangyshlak and Central Asian regions).

The industry's role is not restricted by its passive participation in realization of the investment programs: it actively affects the technical policy of the oil and gas industry and its investment accumulation.

In implementing specific-purpose programs for the country's fuel and power complex, the greatest difficulties arise, as a rule, in surface (site) construction. Growth in the amounts of construction of trunk pipelines has required a substantial speedup in the construction of surface facilities, especially of gas-compressor and oil-repumping stations.

The growing program of surface construction can be realized through wide industrialization and maximum transfer of construction work to the factory environment. The main portion of the measures to industrialize and to improve three-dimensional layout solutions is based upon use of the outfitted-module method: by the end of the current five-year plan the amount of work done by this progressive method will be about 20 percent of the industry's overall work program.

A program for further development of the outfitted-module construction method up to 1985 has been developed and is being realized in accordance with these tasks.

In order to speed up introduction of the outfitted-module method, Minneftegazstroy has taken upon itself the design of outfitted-module installations (BKU's). Unified designs for structures and life-support systems for ground facilities--water-main and purification structures, the lubricants facilities, the power-engineering unit, the operational services units, the repair unit, and so on, have been developed.

Minneftegazstroy design organizations have provided for the development and introduction of installations for the integrated treatment of 20 billion cubic meters of gas per year--the largest in world experience.

Standardized design solutions for unified, outfitted-module KS's [compressor stations] with various types of gas-pumping units (GTN-25, GTN-16, GPA-Ts-16, STD-12500, GPU-10P, GTK-10-4, GPA-Ts-6.3 and GTN-6) have been developed jointly with Mingazprom [Ministry of Gas Industry]. Their introduction will enable the labor intensiveness of work at the construction site to be reduced by 15-67 percent (depending upon the types of GPA's [gas-pumping units] used), the density of the site buildup to be increased from 39 to 45 percent, metals intensiveness to be reduced by 12-35 percent, and construction periods to be cut by 10-35 percent. The development of a unified series of designs of box modules, sectional modules and outfitted buildings, as well as industry restricting standards on equipment and articles shipped to outfit BKU's, is being perfected.

Up till now, Minneftegazstroy has created practically a subbranch of outfitted-module construction, which includes scientific-research and design-development organizations, the Sibkomplektmontazh experimental association and eight mobile specialized construction and installing trusts.

However, the existing production potential still is not being used efficiently enough. Operations at the construction site still have not been reduced to the erection of modules and the hook-up of utility and service lines.

Thus, the use of variable-height modules (BIV's) inevitably leads to additional installing work at the construction site because of the impossibility of placing large-dimension equipment in modules less than 2.5 meters tall.

Improvement of this structure has eliminated a number of deficiencies but has lowered the economic-feasibility indicator. Metals-intensiveness of the panels is high, and full seal of the panel joints when they are adjusted to the facility is not insured. Holes are made for the passage of utility and service lines while these intermodule lines are being installed at the site.

There are also still a number of objective difficulties that reduce the quality and efficiency of use of outfitted-module installations. The supplying of effective heat-insulating materials has not been provided for fully. The funds allocated for aluminum sheet and shaped planking for enclosure structure are insufficient.

A situation has taken shape in which all branch scientific-research institutes and design bureaus are searching for new design solutions for module installations, are proposing numerous different types of modules, and are extremely poorly engaged in improving their manufacturing technology and raising production sophistication at the factories and assembling and outfitting enterprises. As a result, we have today a large number of design solutions for modules: sometimes more than 10 design solutions have been proposed for various facilities that have one functional purpose. This unjustifiably increases the products mix at the enterprises and prevents regularization in organizing operations both at the plants when they make the modules and at the facilities being built.

Industrialization in surface construction should and will be further developed in the following directions: a sharp reduction in the total number of modules and modular installations; maximum unification and reduction in the mix of design solutions; and conversion from separate modules to integrated outfitted-module structures that weigh up to 1,000-1,300 tons (supermodules).

We face the task of converting gradually but rapidly from modular objects to modular facilities or to modular structures that are ready for operational use. It is necessary to organize flow-line construction of modular objects that are of like type or similar in design solutions and amounts of work by specialized surface-facility construction trusts.

The technical basis for unifying modularized installations will be developed in accordance with the so-called short box design of SPKB [Special Design Bureau] of Proyektneftegazspetsmontazh [Design Office of the Main Administration

for Installing Operating Equipment at Facilities of Oil and Gas Industry Enterprises of the RSFSR Ministry of Construction] and the EKB [Experimental Design Bureau] for Reinforced Concrete. The solutions adopted in the design will eliminate many deficiencies of BIV-type modules.

The design will provide for the output of modularized installations that are practically completely readied for operation. Being completely enclosed, they reduce transport damage to a minimum and enable the commodity's value to be sharply improved in the factory environment.

The conversion to small modules is only the beginning of unification work. There is still equipment whose dimensions are greater than are acceptable to the transport schemes, and those which are of small unit power and productivity.

Right now an interagency program for introducing outfitted-module construction during 1986-1990 is being developed that will call for the realization of previously adopted solutions for the coordination of engineering requirements for the development of equipment for oil and gas industry facilities. Many types of equipment, KIPiA [monitoring and measuring instruments and automation] apparatus, and communications for oil and gas recovering enterprises are not included in UB-type unified modules, and this necessitates the use of intermediate solutions that are not by far the most effective ones.

It is necessary, along with work to unify modular installations on the existing engineering base, to organize the production of test models of short modules (BN's), to check them comprehensively, and to start series production as quickly as possible.

The potential of this stage of development of the outfitted-module construction method obviously will be exhausted in the next 3-5 years. Therefore, we must be prepared to use today the newest results of scientific research in designing and organizing the construction of surface facilities. One of the more progressive directions is the creation of sealed installations for pumping oil and gas, with unitization in a single framework of the electric motor and the pump or injector.

According to VNIIST [All-Union Scientific-Research Institute for Construction of Trunk Pipelines] calculations, open-type oil-pumping units allow the construction and installing work volume and the labor intensiveness of building facilities to be cut in half and metals intensiveness to be cut almost 6-fold. Sealed units are 3-fold to 4-fold more effective than open units.

VNIIST scientists and designers have already prepared technical assignments for the manufacture of test models of sealed units, and draft studies and calculations for determining the basic constructional and operating characteristics have been made. The job now is to pave the way for making test models.

The potential for improving the outfitted-module method through the wide use of high-capacity units--supermodules that weigh up to 1,000 tons or more--still have not been exhausted.

The output of horizontal gas absorption-drying units over the whole parametric series of productivity is being organized. Placing them in container modules for the purpose of configuring UKPG's [integrated gas-treatment installations] with capacities of 20-26 billion cubic meters per year will enable construction volume to be cut and labor expenditure to be reduced 5-fold. The construction volume of the structures is being cut almost 10-fold; this, in turn, leads to a reduction in energy consumption during operations. The time has come to start to introduce such solutions not only at gas fields but also at oilfields and at certain facilities that transport hydrocarbon raw materials.

Substantial reserves are concealed in organizing construction on the surface. According to some data, about one-third of the economic benefit from using new technology can be obtained precisely in this sphere, primarily at the stage of construction-operations preparation (PSP).

At the heart of PSP are measures of an organizational and technical nature. Steps of an economic-planning, socio-economic and economico-financial nature (the construction financing plan, the social-development plan, and so on) are being developed on the basis of these measures.

Areas for improving organizational and technical preparation (OTP) are determined by the principles of standardization, automation, systems analysis and specialization by type. Proceeding from these principles, the industry has worked out standard provisioning for a unified OTP system. Work has been done to specialize by type the technology of building surface facilities--standard types of PPR [scheduled preventive maintenance] have been developed for compressor stations equipped with GPU-10, GPA-Ts-6.3, GPA-Ts-16 and GTN-25 units and for BKNS-3.6, BKNS-12.5 and BMPNS-12.5 units. The bases for structural support of the system--a network of Orgtekhstroy's [State Trusts for the Industrialization of Construction Work] under NIPIorgneftegazstroy [Scientific-Research and Design Institute for the State Trust for Industrializing the Construction of Oil and Gas Industry Enterprises] and for PSP service in construction and installing organizations--have been created.

However, as an analysis of questionnaire-type surveys has indicated, some production organizations prepare unsystematically, and the procedure for and the amounts of preparation made and the list of tasks performed do not correspond with the requirements upon which standard provisioning of a unified system for preparation are based. The organizational and technological work does not meet modern requirements: designs for doing the work at surface facilities are not correlated with the production potential of the specific construction and installing organization; the technology for erecting facilities is not fully specialized by type; and computers for solving various tasks are being introduced slowly. Lacking is a unified industrywide approach to the development and use of program and information support for the computer-assisted solution of organizational and technical preparation tasks. The structure of PSP services in construction and installing organizations still has not been perfected.

At the same time, the results of the analysis testify to precision in coordinating plan drafts and approved plans (the average deviation of plan drafts

from those approved does not exceed 15-20 percent); to the stability of the construction and installing organizational structure; and to the rising level of the provisioning of design and budget-estimating documentation

All these are prerequisites for creating in the industry's construction and installing organizations a unified system of organizational and technical preparation for construction work during the erection of surface facilities.

The industry's construction and installing organizations should convert to making organizational and technical preparations in accordance with the principles of the standard provisioning of the unified OTP system.

The industry's institutes should develop in 1984 a system of branch standards for reserve support for consolidated sets of operations for developing POR's [work organization plans] for the annual program with the use of computers.

NIPIorgneftegazstroy and VNIIST must develop technical standards documentation for organizing within the industry a unified system for economic-plan, socio-economic and economico-financial type preparation for the construction work involved in erecting surface facilities.

Growth in every possible way of the share of fully prefabricated facilities for regions that are already developed and an increase in the production volume of containerized-module and three-dimensional module apartment houses for the North's remote regions remain a main area for raising the technical level in housing and nonindustrial construction. Capacity for large panel housing construction still is not being fully used by Glavneftegazstroy, Tatneftestroy and Turkmenneftegazstroy. Moreover, the Almetyevsk, Orenburg, Otradnaya and Neftekamsk plants worked worse last year than in 1982 without any objective cause. These subunits are extremely slow in introducing technology that saves energy and materials and new solutions for improving the plant's technology. Articles are heat-treated mainly by steam-curing, without using gas-combustion products; low-noise vibration installations are not being used; and the production of forged embedded parts has not been organized.

The industry's science and design-development organizations are paying little attention to searching for and developing progressive structure and technological solutions for housing and nonindustrial construction. Research and design developments should be aimed at reducing the number of operations in industrial processes by improving the design and manufacturability and at increasing the factory readiness and the precision of manufacture of housing parts. All this will create a good base for the integrated mechanization of building-erecting processes and for later conversion to the use of means for automating and robotizing them.

The level of large-panel housing should be brought up to 85 percent of the total amount of housing for the country's European part, and up to 95 percent for West Siberia.

There are many unsolved problems in the construction of surface housing and social, cultural and personal-services facilities in the traditional versions. Roofing and decorating work are being performed without the use of industrialized and highly mechanized methods.

The basic directions for improving operations here are as follows. Collaboration must be established with SibZNIIEP [Siberian Zonal Scientific-Research Institute for Standard and Experimental Design] and other institutes that are engaged in developing structure for roll-free roofing. VNIIST must be charged with creating new materials and compositions for the mechanized deposition spraying of resins, polymers and chemical-industry wastes.

Glavneftegazstroymekhanizatsiya [Main Administration for Mechanization of Construction of Oil and Gas Industry Enterprises] and Soyuzremonttruboprovodtekhnika [All-Union Association for the Repair of Trunk Pipeline Equipment] should increase--and at least double--the production of small, low-powered equipment. Scientific subunits must develop compositions of gypsum, phosphogypsum and other slow-setting compounds that contain artificial resins and which make "wet" processes technically feasible and enable them to be performed with existing means of mechanization.

It is necessary to develop and realize a broad program of collaboration with NIIZhB [Scientific-Research Institute for Concrete and Reinforced Concrete] with a view to radically restructuring concreting technology. New plasticizers, means for protecting concrete from corrosion, and economical types of structure and means for mechanizing operations are needed.

With a view to correlating plans for providing the industry with all the necessary types of structure and materials, a scientific and technical program for introducing off-the-shelf structures and outfitted-module installations is now being readied with USSR Gosstroy participation. The forces and experience of USSR Gosstroy scientific and design organizations will be enlisted for this problem.

A plan for joint studies by the EKB for Reinforced Concrete and NIIZhB on the technology for roll-type rolled stock for reinforced-concrete articles made of fine-aggregate concrete, on more exact definition of the area of use of heat-treated concrete and reinforced-concrete structure by the products of natural-gas combustion, on organization of the industrial production of azerite, and so on will be readied.

A most important problem of surface construction is reduction in the use of manual labor. Many types of work right now are at the maximum level of mechanization (for example, earthmoving work is 99 percent and higher), but in some operations the amount of manual labor is still great. The benefit of a high level of installing-operations mechanization is reduced greatly because of the large amount of manual operations in the finishing work and in the installation of roofing and floors. The mechanisms developed and used are not joined into a single operating chain either as to productivity or to the power sources utilized. These create potential opportunities for the occurrence of malfunctions and of interruptions of the operating process.

Attempts were undertaken earlier to develop schemes for the integrated mechanization of surface-construction work, but they have not been used widely. These schemes should be revised and deadlines and procedures for their introduction established.

The specific-purpose integrated program for reducing manual labor within the industry that has been prepared considers the requirements of construction organizations. Its realization will enable the organization of work in surface construction to be improved.

The measures planned for improving surface construction will be carried out if all the industry's subunits--scientific-research institutes, design bureaus and construction and production organizations--will persistently accelerate the introduction of progressive developments.

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WAYS FOR IMPROVING OUTFITTED-MODULE CONSTRUCTION MULLED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 8, Aug 84 pp 7-9

[Article by N. S. Morozov and A. B. Rubinshteyn of the EKB [Experimental Design Bureau] for Reinforced Concrete: "The Improvement of Structure in Outfitted-Module Construction: Problems and Prospects"]

[Text] Outfitted-module construction, the designs for which are being developed by the industry's organizations, is the most rational trend in erecting oil and gas industry facilities and should be the principal trend in the next decade.

At the same time, it has become necessary to evaluate all over again in the modern era the rationality of using in outfitted-module construction specific types of easily assembled, mobile and other constructional structure for buildings and structures for various functional purposes, to unify them when possible, and to examine also questions of siting and equipping the construction-industry enterprises at which this structure should be manufactured.

The industry must have a mix of constructional structure for outfitted-module construction that is broad enough to enable surface facilities to be built in regions with different climatic conditions with the greatest of technical and economic benefit. These should include: sets of structure for frame-and-panel buildings; buildings assembled from large boards (or panels); buildings assembled from folding sections and other structure similar thereto that enable consolidated assembly; arched buildings; self-contained production-type box modules completely readied at the factory; three-dimensional modules for buildings of the so-called "cellular" configuration; mobile housing and buildings for social and personal services that are fully readied at the factory; and mobile social and personal-services buildings and housing made of containerized modules highly readied at the factory.

The industry, with the active participation of the EKB for Reinforced Concrete, has done definite work on all this structure.

Unified-framework production-type buildings over the whole range thereof that the industry requires, including individual shelters for GPU-10, GTN-16 and GTN-25 units that are made of effective wide-flange shapes, have been developed. Steel consumption for these frames does not exceed 48-60 kg per square meter for a building. Savings of steel are 12-18 percent, and

labor expenditure at the plants and construction projects is reduced by 15-20 percent. Thanks to lightness of weight and reliability of assembly, the framework members can be consolidated at the construction site and assembled with consolidating components.

In 1983 more than 15,000 tons of such metal structure were produced and assembled, about 2,000 tons of metal were saved, and the economic benefit was about 1 million rubles.

Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] is now manufacturing more than 1 million square meters of enclosure panels, basically metal. In recent years, a trend toward a reduction in metal consumption in all enclosure structure developed by the EKB for Reinforced Concrete has been noted.

The production of PPT-type cover panels, the use of which will enable steel consumption to be reduced by 8 kg per square meter of panel by using effective section, has started. Jointly with VNIIST [All-Union Scientific-Research Institute for Construction of Trunk Pipelines], Sibkomplektmontazh and SibNIPIgazstroy [Siberian Scientific-Research and Design Institute for the Design of Gas Industry Enterprises], the EKB for Reinforced Concrete has developed and introduced two-layer panels based upon PSF-VNIIST foam plastic. A variant of APS-type aluminum panels with replaceable inner aluminum sheathing with asbestos-cement, which will enable 2.5 kg of aluminum to be saved per square meter of panel, has been developed.

Work is being done to create cover panels of reduced height of the corrugated shape (60 and 44 mm instead of 80 mm). Test models of panels made of cement-chipboard (TsSP) with an aluminum frame are being produced and tested, and panels with the frame and sheathing made of TsSP are being developed. Introduction of these developments will enable metal consumption for enclosure structure to be cut by more than 40 percent.

The Serpukhov KSK [constructional-structure combine] manufactures each year about 80,000 square meters of SKZ-M type folding sections. The EKB for Reinforced Concrete in 1983 revised the documentation, and components and certain parts of the sections were improved. The sections will enable buildings 12 and 24 meters wide (two spans of 12 meters each) to be assembled for various purposes and in practically all the country's climate belts. However, an analysis of the manufacture, transporting and assembly of folding sections and experience in operating buildings made of them reveal a number of important deficiencies.

In order to eliminate the faults, the EKB has studied technical solutions for buildings that were shipped completely outfitted and were made of large panels 12, 12+12, 18 and 18+18 meters in span and from 3.6 to 7.8 meters in height, with hoists and without them.

Such buildings, possessing practically the same degree of readiness as the folding sections, are more transportable, less vulnerable to damage during assembly, and less labor intensive in manufacture.

In our opinion, folding sections and buildings made of large panels can both be used in practice. It is necessary only to pinpoint more closely the areas of their rational use, to revise the design of the components that join the sections' crossbar with the posts, after providing them with reliable sensing of the calculated forces, and, the main thing, to solve the question of outfitted delivery to construction sites of the whole set of constructional structure, including members for closing and sealing the joints and the technical documentation for erecting SKZ-type buildings.

The 24-meter span sections that have been proposed by some organizations require, in our view, serious revision, since the basic consolidated assembly of members of the half-sections and the preliminary assembly of half-sections into sections are done directly on the job, and in this case labor intensiveness is greatly increased, as is the number of assembling members.

Moreover, serious analysis of the effectiveness of using these sections in comparison with buildings of other types of the same span should precede the development of working documentation.

In regions with especially difficult natural and climatic conditions for siting heated and unheated warehouses, garages, dining halls, sports buildings, cinemas and some production premises, it is desirable to use arch-type buildings. They have better aerodynamics and are not drafty. Sibkomplektmontazh is now mastering the manufacture of arch-type buildings that are stick-built but assembling them is labor intensive, and during the Arctic winter it is often impossible.

In accordance with an agreement with Sibkomplektmontazh, the EKB for Reinforced Concrete is studying variants of these arch-type buildings with the enclosures made of two-layer panels with spans of 9, 12, 15 and 18 meters.

An important step in improving outfitted-module construction of production buildings is the introduction, now under way, of BIV-type variable-height modules, a complete set of documentation for which has been developed for enclosures of various lengths and types. In our opinion, they will also find use in the future in all cases where the height of the buildings' rooms are to be more than 2.5 meters (the line-apparatus departments of communications centers, the filters of purification structures, dining halls that seat 250 or more, and so on).

At the same time, work done recently in the country and in the industry to reduce equipment dimensions for oil and gas transporting facilities will enable a substantial portion of them (up to 80 percent, according to some forecasts) to be placed in modules where the room height is 2.5 meters. The EKB, in collaboration with SPKB [Special Design-Development Bureau] of Proyektneftegazspetsmontazh [Special Design Office of the Main Administration for Installing Operating Equipment at Facilities of Oil and Gas Industry Enterprises of the RSFSR's Ministry of Construction], has developed technical solutions for such modules. "Short" modules will enable: the factory readiness of the buildings to be raised practically to the maximum possible; the project's labor intensiveness and production costs to be reduced by 25-30 percent; and the metals intensiveness of cellular-configuration buildings to be cut by

40 percent. They also should become the basic modules that are used in the industry when erecting auxiliary-operations buildings.

A combining of already-mastered solitary UB-type modules with cylindrical multifunctional TsTB-type modules, features of which are increased safety during transport and reductions of metal intensiveness by 30 percent and of production costs per module by 800-900 rubles, is promising for the industry.

In essence, TsTB modules, which are intended for operating and auxiliary equipment, are a development of cylindrical TsUB's, which have proved themselves well. In order to introduce TsTB modules widely, it is necessary that the manufacturing plant be designated, test models produted and acceptance by an interagency commission be granted.

I would like to dwell especially on the problem of converting the industry to a single typ of module for outfitted-module installations. In our view, full unity of all members of module structure that are producible within the industry by various enterprises and are intended for operation in various parts of the country cannot be achieved. At the same time, unified requirements must be established for modules in regard to dimensions of the premises, loads on the footings, the places and methods for fastening the equipment, the prerequisites for transporting and assembling, the resting on the footings, and so on. Modules that satisfy these unifying requirements can be interchangeable without readjusting the tie-in of the equipment in them.

There are no such unifying requirements at present within the industry, but the existing OST [All-Union Standard] must be revised to take into account the experience the ministry has gained and the differences that have been revealed in approaches to this problem by various organizations.

The development and coordination with client ministries of a single industry catalog of BKU's [integrated-module installations] must be speeded up. This will enable the mix of regular modules and box modules produced to be reduced.

The industry has developed designs for mobile buildings for various purposes. A portion of them are being produced by the industry's construction-industry enterprises.

A most important recent development are sets of field settlements for 50, 100, 200 and 500 residents, which are to include many mobile buildings. The most rapid mastery of the production of these buildings, which is envisioned in the designs for the settlements, will permit modern, comfortable living conditions on the line for blue-collar and white-collar workers, and the settlements themselves will get a finished architectural appearance.

In order to speed up introduction of the settlement sets, it is desirable to established a special industry program.

Work done in 1983 by the EKB for Reinforced Concrete has enabled the metals intensiveness of mobile collapsible buildings to be reduced from 100 to 73-78 kg per square meter of area and to bring their heat-engineering characteristics into conformity with modern requirements, bringing these buildings up to the level of the best models without changing their basic solutions. Soyuzneftegazstroykonstruktsiya is converting to the production of buildings in accordance with the revised documentation.

Experience gained in the industry will enable conversion, during 1986-1987, to the output of new, modern modern structure for mobile buildings, in which the advantages of the existing solutions would be retained, the manufacturing technology improved and durability increased.

The Volokolamsk plant must master the new basic TsUB-6 structure and the functional units based upon it and arrange for the output of complexes of dormitories made of TsUB modules, for regions with especially difficult natural and climatic conditions.

The length of the modules produced by the Oktyabr' plant should remain at 12 meters, since this will enable costs at the construction site to be reduced to a minimum. Improvement of module structure can proceed along the line of assembling the modules' walls, made of panels 3-4 meters long, dispensing with metal facing of the builders' interior walls and using a nonmetal roof and improved window design and lift-support systems. For this purpose in particular, the EKB for Reinforced Concrete has fabricated a model of a module that uses TsSP board. Structure and a technology for gluing the roof's polymer cover are being developed.

The Bugulma Constructional-Structure Combine should stop producing obsolete BZh-3 modules and organize the production thereat and at the Oktyabr' Metal-Structure Plant of TsUB type modules in the amount of about 1,500 units per year.

The outfitted-module method can be applied also to the construction of buildings for social, cultural and personal-services purposes in cities. The EKB for Reinforced Concrete has developed structure for open reinforced-concrete modules and has created the basic solutions for buildings for a school and kindergarten combine. It is desirable to test the construction of one of these buildings in Tyumen or Surgut, since the structure for it can be manufactured at existing production sites.

The quality of manufactured structure requires important improvement. Not all the plants have the necessary equipment and enough skilled personnel yet. The preparation of materials and the manufacture of semifinished items are often performed with deviations from the designs, and many materials are replaced by materials not in the design.

Further improvement of the outfitted-module construction method requires the solution of a number of general organizational and technical problems. Improvement of constructional structure should be based upon new, promising materials and articles. The problem of delivering them to the plants must be solved. These materials include: TsSP board, galvanized shaped planking with a polymer coating 0.5-0.6 mm thick, a metal-base laminate, rigid mineral-wool sheet, glass mat with a bulk density of 20-30 kg per cubic meter, "butapen" type self-gluing stuffing, polymer materials of the "butizol" and "buterol" types for soft sealing, fire-retardant decorating materials, corrosion-resistant fastening members, small-dimension highly effective equipment for heating, water-supply and ventilation systems, and specially adapted furniture.

New materials cannot simply replace those used. A set of experimental and research work aimed at developing structure and the technology for manufacturing it must be conducted, and technical documentation must be revised.

In order to speed up the development of new structure, the system of planning experimental design work must be improved. Prevailing practice, under which plans for experimental design, which are saturated to the limit with specific developments and are approved at the end of the preceding year, compels development workers to resist the execution of tasks not in the plan, the necessity for which arises within the industry several times per month. Therefore, the plans should call for no less than 25-30 percent for troubleshooting. This will enable ongoing tasks of improving structure to be resolved in short times.

In order to solve problems of developing and improving structure for outfitted module construction, designs must be created for rebuilding and developing enterprises of the construction industry that produce this structure, and efforts of design organizations, design developers and researchers must be concentrated to a greater extent than they are at present. It is desirable to strengthen organizations that perform work in these areas, to eliminate duplication in the research they perform, to develop their experimental base, and, in particular, to construct a laboratory building of 5,000 square meters in an area at the testing ground of the EKB for Reinforced-Concrete in Khlebnikovo Settlement of Moscow Oblast.

It is desirable that one of the industry's machinery plants be designated an experimental plant, entrusting it with the manufacture, plant testing and refinement, jointly with development workers, of prototypes of nonstandardized equipment.

The erection and turnkey turnover of mobile buildings should be entrusted to specialized subunits. In this connection, it is desirable to create within Soyuzneftegazstroykonstruktsiya Association a special administration for the assembly of collapsible mobile buildings and to entrust the manufacture of BN [short module] and BIV type modules to a specially created association, whose composition is to include an assembling and outfitting enterprise. It is desirable to create such enterprises in the European part of the USSR--at Shchelkovo and Almetyevsk, for example.

Modular buildings should be used only where there is a guarantee that the modules will be supplied with the industrial equipment at the factory. Otherwise, it is quicker, cheaper and less labor-consuming to build frame-and-panel buildings, the structure for which can be shipped outfitted to the construction site.

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PIPELINE CONSTRUCTION

NEW INSULATION, PROTECTIVE POLYMER CITED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 Aug 84 p 1

[Article by SOTSIALISTICHESKAYA INDUSTRIYA correspondent V. Lagovskiy: "Armor for Pipelines", under the rubric "Science for Industry"]

[Text] Every year in our country hundreds of kilometers of new oil and gas pipelines are laid and operating pipelines repaired. In order to protect them from corrosion, insulating materials are needed which are resistant to heat and cold, corrosive agents, wear and high voltage. Polymer coatings, which possess these unique properties, are being developed in the Moscow Institute of the Petrochemical and Gas Industry imeni I. M. Gubkin.

"Attention! Accelerator In Operation!", warned the lettering on the massive door. Behind the door was a research stand belonging to the department of physical and colloidal chemistry where an experiment, headed by Senior Associate of Science A. Chebatorevskiy, one of the creators of the new materials, was being conducted. There, behind the concrete laboratory walls, streams of charged particles are penetrating a film of polymer. Why?

"To give it the properties we need." explains the scientist. "The radiation rearranges the entire internal structure of the polymer. It's as if it sews the molecules to each other. As a result the strength of the film is increased by 1.5-fold, and its resistance to cracking by several thousand-fold.

Polymers with such characteristics would be useful in many branches of industry, but for insulating oil and gas pipelines which remain underground for decades, there are few as strong.

Through the introduction of various additives, we are striving for heat and corrosion resistance," says A. Chebatorevskiy. "Which additives, you ask? For now that's a secret. But as to the extent of their effectiveness, judge for yourself."

Several graphs are lying on the table, test results for Japanese, American and Soviet insulation. All the parameters which usually determine quality and reliability are 1.5-2-fold higher for ours. But besides that, it has another valuable feature...a memory.

In my hands I have a piece of insulation, a smooth black ribbon, which has just undergone an unusual process. First they irradiated it with a stream of charged particles, and then stretched it. But now a laboratory worker brings it toward the flame of a gas burner, and the ribbon contracts before my eyes.

"The same thing also happens along a pipeline," explains A. Chebatorevskiy. "When the band is wound around the pipe in such a way that its inside layer is melted and adheres to the metal, the upper layer will contract, increasing the dependability of the joint many times. In simpler terms, you could say that the irradiation, which cross-links the polymer molecules, also lines them up again in a specific sequence, which they 'remember' when heated."

But if it's fairly easy to wrap the band around a pipe, then how are components with more complex forms protected from corrosion, for instance shut-off devices such as the different stopcocks and valves?

"A promising method has been developed to take care of that," recounts the scientist. "Polymer powders are sprayed in an electrostatic field. Falling onto the pre-heated surface, the tiny polymer granules melt and form a film from 0.01-3 mm thick. And this film protects the component.

"We have known about the method itself," adds Doctor of Geological and Mineralogical Sciences A. Dmitriyevskiy, the institutes pro-rector for scientific work. "But there was no polymer which had those properties which would permit its use on oil and gas pipelines. Moreover, it was important to find chemical agents which would cross-link the polymer molecules at the instant the powder, as well as the radiation, was applied, thereby increasing its resistance.

Scientists of the Gubkin Institute, working with associates from the USSR Academy of Sciences Institute of Chemical Physics, and the Organic Synthesis Production Association, of Kazan have now created several of these materials. And at the same time, they have proposed a brand-new method of obtaining powders from them. It permits the discarding of two labor-intensive and unproductive stages of the traditional processing of plastics--granulation and crushing the grist of the produced granules. A very fine powder is obtained quickly from a melted mass of polymer. By doing just this, the production cost of a ton of powder is reduced by 85-270 rubles.

The work which has been done is tremendous; it is both scientific and practical. In front of me there is a bulky folder of authorship certificates, obtained in the course of developing the formulas and manufacturing process methods for the new insulation materials. There are over 50 of them. But the materials themselves have proven their dependability, having passed all sorts of tests, including natural tests under real pipeline conditions. Now it is a matter for industry. Gas and oil workers are not the only ones who need the unique polymer materials. The polymers will be capable of protecting the most varied assortment of machines and structures, from bridges to passenger autos and household appliances. And as the scientists believe, incorporation of these materials and the progressive energy-saving technology of their production is possible without additional outlays of capital, on existing equipment.

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PIPELINE CONSTRUCTION

INTERNATIONAL GAS PIPELINE COLLECTIVES CITED

Yerevan KOMMUNIST in Russian 8 Aug 84 p 1

[Article by A. Shkulev: "Republic Gas Workers in Central Asia", under the rubric "On the Tracks of the Five-Year Plan"]

[Text] The Ustyurt Plateau, located alongside the Aral Sea and the Amu Darya River delta, greeted the gas construction workers with a hurricane wind and a sandstorm.

After the picturesque Carpathians, with their dense thickets of beech and fir, friendly emerald meadows [poloninami] and murmuring streams, the plateau looked like a lifeless desert, covered with sand dunes, devoid of trees and bushes. Summers here are ruled by the extreme heat, and winter is damp, with frequent severe frosts.

The people in charge of this construction job were concerned, first of all, with accomodations for the 700 people who had come to the new pipeline right-of-way, so they built two field cities out of Baikal-Amur Mainline railroad cars and installed air conditioners, television sets and refrigerators, set up mess halls, opened stores and clinics, baths and other domestic facilities. In short, they set up all the necessary conveniences and comforts for life and work out in the desert. S. Gevorkyan, and SU [Construction Administration] No 1 did a great service in this.

At the same time, they organized production depots, and assembled two integrated line-production groups, headed by Yuriy Rybal'chenko and Robert Saakyan, two men experienced in gas construction.

On one of the very cold November days of last year the builders moved high-capacity equipment out from the Carpathian section of the Urengoy-Uzhgorod pipeline to the new Central Asia-Center 4 right-of-way. The USSR Ministry of Construction of Petroleum and Gas Industry Enterprises [Minneftegazstroy] commissioned the Transcaucasus Soyuzintergazstroy [expansion unknown] Pipeline Construction Trust to lay the new Khiva-Beyneu pipeline, which is 235 km long, and has a diameter of 1220-1420 mm. The Zaktruboprovodstroy [Transcaucasus Pipeline Construction] Trust put 80 km of this pipeline into operation in May 1984.

This international collective of gas construction workers labors with great enthusiasm. Every day they increase their rates of construction work, reliably welding and sheathing the pipe, laying it in the trench and backfilling it. The brigades of Anatoliy Pavlov, Vanik Dabagyan, Viktor Gonda, Lerman Ayranetyan and Yuriy Avakyan, leaders in the socialist competition, exemplify selfless labor. Stubbornly overcoming all obstacles along the way, such as basins and cave-ins, the pipeliners, working in difficult climatic conditions, have brought their daily rate of pipeline laid up to one and more km on the Central Asia-Center-4 route, and already have 100 km of the steel main laid in the trench.

At present, every effort is being made by the Zaktruboprovodstroy SU-1 and SU-2 gas construction workers to complete the line section of the pipeline ahead of schedule, and to open the way for a large flow of natural gas from Central Asia to the country's central regions more quickly.

The Zaktruboprovodstroy Trust was awarded their second All-Union bonus for their work totals for the first half of the year, and on 26 July reported their completion of the plan for the 11 Five-Year Plan period ahead of schedule.

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PIPELINE CONSTRUCTION

GAS MAIN CONSTRUCTION PROGRESS OUTLINED

Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 84 p 9

[Article by G. Veselkov: "On the Gas Pipeline Routes in August" on the occasion of Oil and Gas Industry Workers' Day]

[Text] Oil and gas industry workers and the people who built the main gas and oil pipelines greeted their professional holiday with new labor achievements. The greeting of the CPSU Central Committee and the USSR Council of Ministers was received with enthusiasm by all those who participated in the construction of the Urengoy-Center 1 pipeline, in connection with putting this gas main, which is over three thousand kilometers long, into operation ahead of schedule.

Making use of the positive experience of line production methods, accumulated during construction of the Urengoy-Uzhgorod, and the Urengoy-Center 1 gas pipelines, the construction workers are working successfully on fulfilling their obligations. As of 1 September the pipe used to build this gas pipeline was almost completely laid, 2,600 km of it having been welded into strings, about 2000 km taken out to the right-of-way, more than 1,700 km welded into the line and almost 1,500 km laid into the pipeline trench.

Individual sections of the pipeline are being put into operation as soon as they are ready. Thus, in the north of Tyumen Oblast a 150-km section has been put on-stream by the Glavsibtruboprovodstroy [Main Siberian Pipeline Construction Association] collective. Another 100-km section of the main pipeline, located in the Sverdlovsk Oblast, is undergoing tests. The 500-km section from the Volga to Yelets is ready for testing.

At present there are 25 line-production crews at work building the gas pipeline. In August, best results in the socialist competition were achieved by the line production crews headed by V. Belyayeva, of a welding and assembly trust, I. Shaykhutdinov of the Tatnefteprovodstroy [Tatar Oil Pipeline Construction] Trust, A Krakhmalev, of the Soyuzgazspetsstroy [All-Union Special Gas Construction] Trust, Yu. Semenyuk, of the Kuybyshevtruboprovodstroy [Kuybyshev Pipeline Construction] Trust, and N. Yevdokimov, of the Lengazspetsstroy [Lengorispolkom Special Gas Construction] Trust.

Right now, special attention is being paid to preparations which will insure uninterrupted work during the upcoming winter season. Equipment, shipments

and other necessary goods are being hauled miles away to the northern sections of the right-of-way, pipe is being welded into strings up on racks, log roads are being built and work is proceeding on compressor station connection points and underwater river crossings. Mingazprom [Ministry of the Gas Industry] should take additional measures to hasten equipment deliveries to the line section of the pipeline and to compressor station connection points.

Intensive efforts are being put forth by construction and installation collectives of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], USSR Minenergo [Ministry of Power and Electrification], USSR Minstroy [Ministry of Construction], USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] and USSR Minpromstroy [Ministry of Industrial Construction] to build and guarantee that all 29 compressor stations on the Urengoy-Center 1 gas pipeline are put into operation this year, and brought up to projected capacity in 1984.

In eight months, five compressor stations have been put into operation and many others are at high stages of readiness. However work rates are still low at the Urengoy, Pelymskaya, Tayezhnaya and certain other stations.

Minneftegazstroy, USSR minstroy, USSR Minpromstroy, USSR Minenergo, and directors of the principle administrations and trusts need to take prompt measures to improve the organization of construction at these stations, to keep the complement of workers and engineering and technical personnel at full strength, and to consolidate necessary material and technical resources.

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BRIEFS

BELORUSSIAN GAS PIPELINE COMPLETED--Zhlobin (Gomel Oblast)--A new gas artery will completely fulfill the natural gas demand of the young fast-growing Belorussian industrial center. Fuel is delivered along the 215-km branch of the Torzhok-Minsk-Ivatseviche pipeline to the Belorussian Metallurgical Conversion Plant which is being built in accordance with the decisions of the 26th CPSU Congress. At the same time, other Zhlobin enterprises and city-dwellers' apartments have been connected to the gas network. By the end of the five-year plan period Siberian gas will occupy a leading place in the fuel balance, not only of the cities, but of most of the villages of Belorussia. This is very important in light of the republic's limited fuel resources. Construction of the third line of the Torzhok-Minsk-Ivatsevichi main will make possible the gasification of all the regions of the republic. [Text] [Baku VYSHKA in Russian 23 Aug 84 p 1]

TALLINNDELIVERS ARCTIC EXCAVATORS--Tallin--Series-production excavators, earmarked for work in regions of the far north, as well as machines produced specifically for construction of the transcontinental main gas pipelines, have been sent to purchasers ahead of schedule by workers of the Tallin-based Talleks Production Association. [By V. Proskura, SOTSIALISTICHESKAYA INDUSTRIYA personal correspondent] [Excerpt] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Sep 84 p 1] 12659

URENGOY-CENTER-1 PIPELINE COMPLETED--Construction on the Urengoy-Center-1 main gas pipeline, one of the largest of the large-diameter pipelines, with a length of over 3000 km, has been completed six months ahead of the planned deadline. The CPSU Central Committee and the USSR Council of Ministers extended hearty congratulations to all those who participated in building this pipeline for this new significant achievement. A special feature of this construction project was the turning over of completed sections by line-production methods, from the initial presentation. Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] integrated production lines, in accordance with the schedule for organization of construction, are now increasing work rates on construction of the Urengoy-Center-2 gas pipeline being laid along the same power supply corridor. As of 1 August, 3000 km of large-diameter pipe out of 3,020 km had shown up at the construction sites. Over 1,500 km of the line have been welded and 1,175 km have been insulated. Glavsibtruboprovodstroy [Main Siberian Pipeline Construction Administration], Glavvostoktruboprovodstroy [Main Eastern Pipeline Construction Administration]

and Glavtruboprovodstroy [Main Pipeline Construction Administration] have accepted socialist obligations to complete construction of the line section of the Urengoy-Center-2 pipeline, not in 1985, but this year. This initiative of the participants in construction of the main pipelines has been warmly supported in the salute of the CPSU Central Committee and the USSR Council of Ministers. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 33, Aug 84 p 3] 12659

LAKOKRASKA DEVELOPS PIPELINE PAINT--Yaroslavl--The Lakokraska [Lac and Paint] Association collective of Yaroslavl has put a reliable and long-lasting coating for gas pipelines into production. The grey powder, manufactured essentially from epoxy resins, needs only to be heated, and it turns into a durable film which is immune to mechanical damage and corrosion. Association specialists developed the new paint in collaboration with scientists of one of the NII's [scientific and research institute] of the industry. Hundreds of motor vehicle and electrotechnical enterprises and other branches of industry are receiving this product. The association collective is constantly updating and improving product quality. More than 15 new types of lacquers, enamels and primer paints have been put into production since the beginning of the five-year plan period. [Text] [Baku VYSHKA in Russian 15 Aug 84 p 1] 12659

CHUVASH PIPELINE WELDING AUTOMATED--Cheboksary--Pipelaying has begun on the Yamburg-Yelets gas pipeline, which traverses the Chuvash region from the Volga to the Sura. The first joint was welded, not manually, as is usual, but with a "Sever" automatic pressure contact welding device. The Chuvash section of the route has become the experimental proving ground for this highly-productive automated unit, which was developed in the Kiev Institute of Electric Arc-Welding imeni Ye. O. Paton. If a qualified welder can weld only one joint of large-diameter pipe per shift, under field conditions, then the "Sever" can accomplish 4-5 times more in an hour. Regarding this, the quality of the joint is guaranteed, and the need for a laboratory check is superfluous. Also eliminated is the labor-intensive practice of preliminary welding of the pipe into long strings atop a stationary rack, as the pipes are placed directly onto the line. [Text] [Baku VYSHKA in Russian 28 Aug 84 p 1] 12659

YAMALO-NENETS UNDERGROUND PIPELINE BEGUN--(TASS)--Construction workers have come to the Yamalo-Nenets Autonomous Okrug to the main section of the future Yamburg-Yelets gas pipeline. They have begun to erect field towns. The underground main is important to the recovery and transmission of natural gas from the Arctic to the center of the country. The volume of work on the Yamburg-Medvezhye Field section, which is over 250 km long, is especially great. It goes through areas of permanently frozen ground. Construction workers have not yet had to deal with such a tremendous stretch of frozen ground. [Text] [Moscow PRAVDA in Russian 10 Aug 84 p 2] 12659

PIPELINE TRANSPORTS GAS-OIL COMBINATION--Novosibirsk--Cannot gas and oil be transported through one and the same pipeline? It can, reply scientists of the Siberian Department of the USSR Academy of Sciences. Their research has shown that if the gas is compressed and the oil is turned into frozen granules which, thanks to Siberia, is no problem, then the process of transporting gas and crude oil becomes very effective and economical. In addition, viscous oil will be transportable to purchasers via underground distribution lines. [By

A. Lyakhov, SOTSIALISTICHESKAYA INDUSTRIYA personal correspondent] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Aug 84 p 2] 12659

YAMALO-NENETS PIPELINE CONSTRUCTION BEGINS--Salekhard (TASS)--Construction workers have come to the Yamalo-Nenets Autonomous Okrug to the main section of the future Yamburg Field-Yelets gas pipeline. They have begun to erect field towns. The underground main is important to the recovery and transmission of natural gas from the Arctic to the center of the country. The volume of work on the Yamburg-Medvezhye Field section, which is over 250 km long, is especially great. It goes through areas of permanently frozen ground. Construction workers have not yet had to deal with such a tremendous stretch of frozen ground. That is why it has been decided to put the experience accumulated during construction of the Urengoy-Pomary-Uzhgorod gas pipeline to maximum use. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 16 Aug 84 p 1] 12659

OXYGEN RUSTPROOFS PIPELINES--(TASS)--Until recently, those who develop anti-corrosion processes believed that the oxygen which was dissolved in water was one of the causes of damage to pipeline metal. Associates of the Institute of Energetics imeni G. M. Krzhizhanovskiy have disproved this view. As their research has shown, oxygen in a stream of water does not activate corrosion, but deters it. It turns out that adding gaseous oxygen to water promotes the formation of an oxidic film on the pipe wall. It is exactly what protects the metal. Here, corrosion is slowed down: 1000-fold on stainless steel, and 10,000-fold on carbon steel. The third power block of the Konakovskaya GRES [State Regional Electric Power Station] is the first to be run on the new system. In connection with this, the high efficiency of the new method has been confirmed. Now it is being used on more than 40 power blocks with supercritical pressure and is being incorporated into AES's. This innovation promises to realize a tremendous economic effect in the national economy. [Text] [Moscow PRAVDA in Russian 10 Jul 84 p 3] 12659

UDMURTIYA PIPELINERS BEGIN CONSTRUCTION--Mozhga, Udmurtskaya ASSR, (TASS)--Construction workers of the Ufa River region's Vostoknefteprovodstroy [Eastern Oil Pipeline Construction] Trust celebrated Communist Labor Day by starting construction on Udmurtiya's 200-km section of the Urengoy-Center-2 gas pipeline. The first joint on the new pipeline route was welded early this morning near the city of Mozhga by the leading arc-welding brigades of V. Krylov and L Gogolev. It's no accident that this event coincided with the labor holiday. The Mozhga production-line collective has outstripped the work schedule by almost half a year on construction of the ultra-long-range gas mains. The collective works by a unified job authorization, achieving a highly efficient use of their production capacity potential. The Mozhga workers began this notable day pleasantly; and they finished it appropriately, by having laid 1.5 km of pipe. This is the collective's highest labor productivity for the entire duration of the job. [Text] [Moscow TRUD in Russian 22 Apr 84 p 1] 12659

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